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ABSTRACT

As the most significant American Indian contribution to world civilization, corn is discussed from historical, socio-cultural, and scientific perspectives. The introduction describes a collaboration between the American Indian Program of Cornell University and the Indigenous Preservation Network Center, which brought students and reservation farmers together for a "cultural encounter" in corn planting. The main body of this document is comprised of the following chapters written by scholars: (1) corn's cosmological importance among the Mayan people; (2) the role of maize as organizing principle of Indian culture; (3) scientific validity of corn agriculture in environmental adaptation; (4) technical contributions made by Indians through their long history of corn growing; (5) cultural practices associated with crop rotation; (6) the history of Indian relocation and the persistent corn culture; (7) economic motivations of Indian corn agriculture; (8) the cultural meaning of corn as mothering and fertility; and (9) a semantic interpretation of history related to corn. The final section contains excerpts from "Keepers of the Earth--a collection of children's stories about Indian corn culture, a partial list of 118 references, and a glossary. Contributors include Nia B. Francisco, Gould Colman, Jose Barreiro, Roderico Teni, Arturo Warman, Jorge Quintana, Jane Mt. Pleasant, Stephen Lewandowski, Milton Barnett, John Mohawk, Alfonso Ortiz, Roy Wright, and Joseph Bruchac. (GGH)

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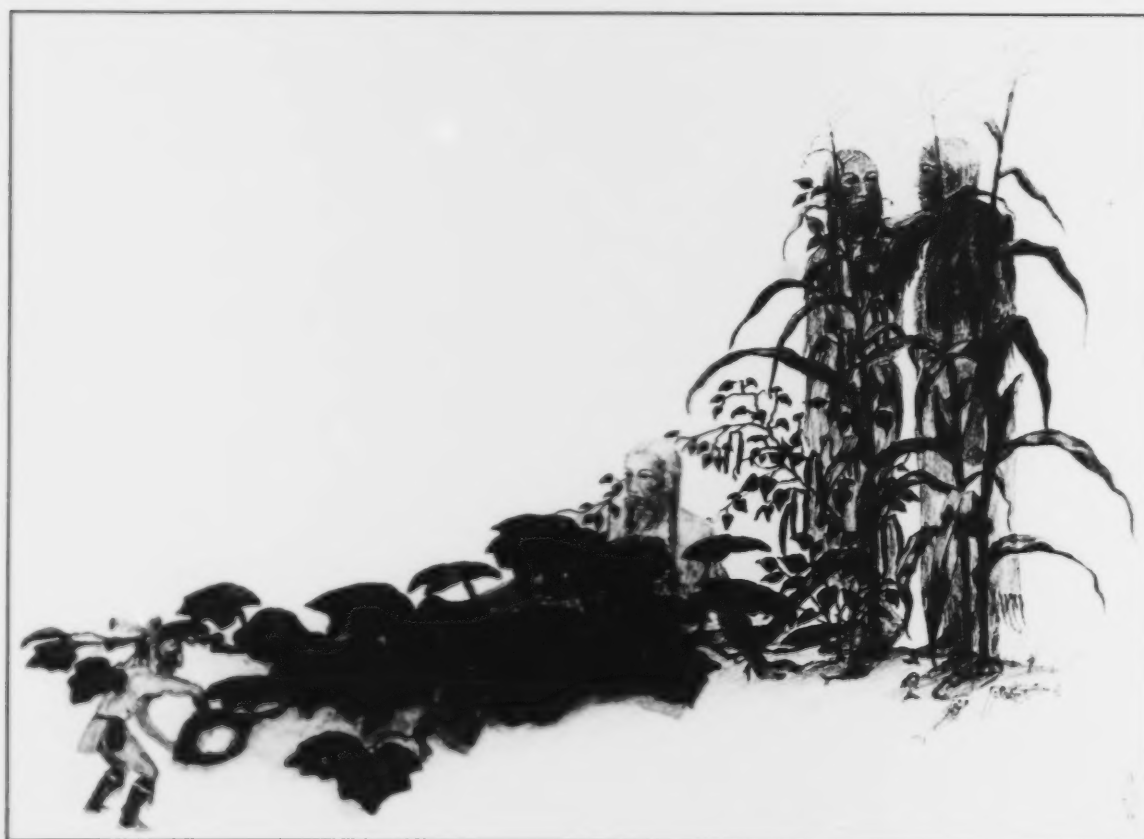
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INDIAN CORN of the AMERICAS

Gift to the World



Columbus Quincentenary Edition
NORTHEAST INDIAN Quarterly, Spring/Summer 1989
José Barreiro, Editor

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Cultural Encounter II

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José Barreiro, Editor

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Cover: "The Three Sisters," Ernest Smith (Seneca), watercolor, 1937.

From the Ernest Smith Collection, Rochester Museum and Science Center, Rochester, New York.

Title Page: "The Three Sisters," John Kahionhes Fadden (Mohawk), ink on paper, 1988. Courtesy of the New York State Museum, Albany.

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"Indian Corn of the Americas—Gift to the World" is the second of the American Indian Program's series of forums designed to explore various topics around the theme of "cultural encounters." Together, these forums build toward a major thematic conference in 1992, the year of the 500th anniversary of the first Columbus voyage and the first contact between European civilization and the indigenous civilization of this continent.

As one of its several missions, the American Indian Program will develop teaching materials on the topics documented during the "Cultural Encounter" conferences. Teachers may obtain information about these materials by contacting the Program office.

This volume is for Indian farmers, past and present: the ones who persisted ...

The conferences and materials of this volume could not have been produced without the generous assistance of many people. We wish to acknowledge the inspired participation of Charlotte Heth, former director of the American Indian Program at Cornell, now at UCLA; Richard Kurin, Heliana Portes de Reus, Olivia Cavajal, and Karen Stewart, from the Smithsonian Institution's Office of Folklife Programs and Alicia Gonzalez, who directs the Smithsonian Institution's Columbus Quincentenary Programs.

Shawls Wrapped Around Prayers From Females

Grandmother Nalí Marie walked
along the narrow trail a horse trail
leading to "Crow's Water Hole" ...

Sheep and goats nibbled their way
along the slopes of nearby hills.
We headed to "Standing Fat Pine Tree."
I skipped passing her several times,
at first distracted by a tiny horny toad.
Grandma walked on.

And next I saw a cotton tail rabbit.
She walked on.
Next by a fallen butterfly with broken wings,
and she walked on ahead.

I skipped real fast after her.
My high topped brown leather shoes
kicking up dust,
and my full skirt flying wild
like a bucking horse's tail.
Pretending to be a running horse.
Passing her again then I saw
on the ground on the trail
a yellow corn kernel laid. One corn kernel.
Remembering how grandfather Aubrey spoke
of killings by Osprey hawks, or eagles,
I didn't pick up the corn kernel.

"Shimá, díísh hat'íí át'é?" I asked.

Grandmother Nalí Marie stopped by me.
She knelt,
and with her hand wrapped in a tattered
white rag concealing a cut from butchering
our temperamental yearly ram, she picked up
the yellow corn kernel.

Sitting under a piñon tree shade,
me picking twigs around her, she spoke.
Maybe to me, more like to someone else,
recalling words of the ancient ones,
she spoke.

Nááááá corn
if a corn kernel is on your path,
whether yellow, white, blue or red —
never pass it by its voice
so quietly speaks to your inner self.
It says, "Take me, and you will prosper plenty
into your old age. A blessing way must be done
to ensure your gift's abundant blessings."

Nalí spoke this time it wasn't to me
more like to the ancient pinon tree
towering over us. Thunder rolled
far away north.

Nalí said,

Once in the existence
when Diné were not Diné,
and sequence of untold events were here,
the walkers of the lands, swimmers of the waters,
fliers of the airs, and even crawlers
of all places fouled up their life ways.
There were confusion, and acts of regret
everywhere ... at that time.
Female and male both were recreated.
White corn ear for the male.
Yellow corn ear for the female.
Corn is life and so very sacred.

Nalí said to me,

That is why
at early dawn
I walk out east with you.
I wrap myself with my penaltón shawl
and you in your shawl.
I pray with you with yellow corn meal.

- Nia B. Francisco

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COMMENTARY

The impact of Rachel Carson's *Silent Spring*, published in 1962, has been slow but sure. Agricultural studies came to a crossroads when the larger machinery, more specialized enterprises, and more complex chemicals which colleges of agriculture and the USDA have recommended for six decades were seen by the public as not necessarily in its interest.

The research and classroom instruction which gave rise to these recommendations has been supported by the public as a contribution to state and national economic development, already a secular faith by 1862 when the Morrill Act fostered higher education in agriculture. At the beginning of this century public investment in agricultural studies expanded greatly so that economic investment in rural areas could be made more attractive.

The implicit bargain, public support in return for contributions to economic development, depended on the public accepting how economic efficiency was calculated in agricultural colleges and the USDA. It seems that the attraction of replacing labor with machinery and chemicals when costs and benefits are calculated in the short term is disappearing when more time is considered.

A host of questions have already come up concerning the long term effects of misplaced chemicals. Other questions may be asked which reach to the stability of rural living. An environment where living and working overlap so that children know what their parents do "at work" and have opportunities to learn by doing may be worth more than short term analyses of industrial applications to agriculture would suggest.

Matters which have been dismissed as philosophical, and hence irrelevant from short term perspectives, may move to center stage now that what has been taken for granted, like the soundness of interstate bridges and highways and the idea that unproductive children make productive adults, is in doubt.

Surely the lives of plants and the lives of the planters and harvesters are connected by more than a sequence of short term encounters. It is time to reconsider the attention currently accorded in agricultural studies since World War I, and to focus upon the enduring aspects of nature and culture which were studied before that preoccupation set in. From this perspective the bargain between the public and colleges of agriculture might well be renewed.

—Gould P. Colman
Cornell University Archivist

INTRODUCTION



A Season Of Corn

On a tractor, a young man plowed and disked two fields. At the office, a conference was planned. It was Spring, 1988, and the season was of corn. The conference would gather expert agronomists, anthropologists, rural sociologists and Indian gardeners to discuss corn. It would result in this volume. The fields would grow corn, which would produce seed and food.

A cooperative project with the Smithsonian's Office of Folklife Programs, the conference envisioned a Fall theme on traditional indigenous subsistence-economy systems. Looking at the values of persistence and the cultural management of tribal economy, it was to have split forums. At the Smithsonian, on September 23 and 24, the "Seeds of the Past" symposium gathered speakers from throughout the continent on topics as diverse as Mapuche pinion gathering, Ojibway fisheries and forest management, Inca chili peppers, Yanomami land needs and all manner of Andean tubers and fruits. Those materials will be edited into a volume and published by the Smithsonian Press. At Cornell on September 26 at the "Corn-Indian Gift to the World"

forum, the subsistence theme persisted but the concentration of papers, published in this volume, was on maize, "the marvelous grain." Forming the second round of presentations in our Columbian Quincentenary "Cultural Encounters" series, these papers are extraordinary in every way, heartfelt as corn is talented and full of refreshing detail.

The most significant American Indian contribution to world civilization, corn appears in Christopher Columbus's log at least twice during his first voyage. The word "maize," which also describes corn, is a gift of the Taino, first Indian civilization subjugated and ultimately destroyed by the conquest. The "staff of life," disregarded briefly by the self-styled discoverers, would become, as Mexican professor Arturo Warman details in these pages, one of the most important food crops in the world, worth more, each year, than all the gold taken out of the Americas by the conquistadores.

To most American Indian peoples, corn was, and is, a relative. That was the message of two other speakers from Meso-America. Roderico Teni, a Maya-Kekchi culture-bearer from Guatemala, talked on the spiritual and cultural meanings of corn to his people, how it is thought about, tended, harvested and respected. Jorge Quintana, agronomist and a Chorotega-Nahua Indian from western Nicaragua, spoke on the cropping of corn as the "pivot in an ecologically-sound agricultural system." Quintana called for the respectful scientific study of indigenous cropping systems that "may seem like superstitions" but which may yield hidden ecological detail in their practice.

Jane Mt. Pleasant, assistant professor of agronomy at Cornell and of Tuscarora ancestry, analyzed Iroquois hill and other planting systems in terms of their stability. Mt. Pleasant detailed the judicious use of organic matter as fertilizer by traditional Indians, as well as rotation and fallow techniques on planting fields. She outlined how present agricultural practices result in soil erosion and discussed how traditional Indian techniques might help correct soil degradation.

Also from among the Iroquois, Seneca scholar John Mohawk applied a historical spin to the topic of corn, seeking implications about human economic organization in the evidence of large granaries reported during colonial military campaigns. His theme was on the values arising from culture rooted in the land, their adaptability and reapplications. Meanwhile, Milton Barnett, Cornell anthropologist and AIP elder, returned

Photo: The Grandfather Corn (Delaware/Iroquois), purple variety. Also called "original corn." The Grandfather is a pod corn, with each kernel covered in its own husk.

to the theme of indigenous persistence with seasoned observations on a 40-year process of relocation and cultural integration. He spoke on the southwestern U.S. cultures of the Mohave and Hopi and the effects of post-World War II relocations on portions of their populations.

From the southwest, too, but months later, senior Indian scholar Alfonso Ortiz, native of Tewa Pueblo, rounded out the season's conference. Professor Ortiz talked on the cultural meanings of corn among the Tewa, analyzing the affirmation symbology of corn in the life cycle of the Pueblo Indian peoples. His talk at Cornell in March 1989 was a fitting finale to the Corn session of "Cultural Encounter."

The suggestion to plant Indian corn had come from traditionally-minded Iroquois, farmers and home gardeners, concerned with degradation of the old Indian corn seed and with the loss of knowledge of Indian farming practices. To retain its vigour, natural corn seed needs the kind of cross-pollination that happens when farmers from different areas exchange their favored strains. But in past generations, the practice of exchanging seeds prior to Spring planting has declined. The result has been a general weakening of the indigenous germplasm.

Traditional native agricultures have also suffered from the impetus to "modernize," which has led to the use of "high input" chemical fertilizers and insecticides, as

fields are given over to single crops. In the case of corn, as with tobacco in the southern states and wheat in the northwest, that practice contributed to a significant deterioration in the condition of soils. In the northeast, the larger Indian farms have been reduced considerably since the 1950s, though farms are still worked in most reservations and there is an active tradition of family gardens.

In 1987, farmers and gardeners from Cattaraugus, Akwesasne, Kahnawake, and Grand River reservations donated seed to grow a field of the Iroquois Tuscarora variety white corn. The idea was to help the seed cross-pollinate naturally. A group of interested people, with backgrounds rooted both at Cornell University and in New York State Indian communities, came together at that time to consider the project and its theme of indigenous agriculture. A secondary, though no less important, assignment to help identify crop and market potentials for native and other small farmers emerged from that discussion.

In the summer of 1987, under the auspices of the Indigenous Preservation Network Center, a four-acre field was planted, both by hand and by tractor. The IPNC, located at Crows Hill Farm, 13 miles southeast of Ithaca, is dedicated to research and educational aspects of native agriculture and is oriented to the revitalization of native cultures and economies. Directed by

Fall Harvest, 1986, Ernie Mohawk's fields, Cattaraugus Reservation.

Photo by Rick Jemison.



agronomist Jorge Quintana, who appears in this volume, the program started a seed bank research program, selecting seed showing smut resistance, strength of stalk and other positive characteristics from the common field. That Fall, at the IPNC fields, a small but determined group of Ithaca-area Indians and friends harvested the four acre crop of the Indian white corn. That same season, one trainee, a Cornell student from Akwesasne, raised his own crop and sold a ton of corn in his home reservation, supplying a central ingredient to the traditional diet for his people and earning \$2,000 for his efforts. He was one of several participants who received training in methodologies of seed genetic selection, design and operation of experiments for field tests, soil sampling and analysis, soil preparation, planting and field maintenance, tabulation and interpretation of data.

Cornell University, the Northeast's major landgrant agricultural college, is also the nerve center of New York State's Extension Services. In line with that mission, the American Indian Program and the IPNC project are cooperating in work with reservation trainees and farmers. The hope is to stimulate respect for the family-based memory or knowledge, the information that resides in the communities and among people who have maintained agriculture. The belief is that such respect is central to a more unified theory of development.

When it comes to the experience of cropping and using the land in a "cultured" way, academic researchers have not always been generous—not in respecting the cultural knowledge base and not in giving back to it from the fruits of applied research. Industrial agriculture, with its large scale prescriptions, has mono-cropped human cultures along with their agricultural fields. The IPNC projects a more connected approach, one that agrees to listen to the empirical experience and uses land to provide food for people, as well as a cash-flow for the food-growing community. The IPNC promotes constructive use of tribal lands and the employment of skilled labor to assist Indian communities in revitalization and productivity on the land. It encourages rural people to reinvestigate and celebrate their land-based cultural and spiritual beliefs.

Because of recent industrial history, many young, middle-aged and certainly older people are severed from a "hands-on" connection to the earth. It is the proof of cultural resiliency that, given the opportunity, many Indian families and individuals will want to participate in discussion and practice about the old corn. Even though, among Iroquois communities, commercial Indian farms and even the art of gardening have been in decline, the community cultures are rich in lore and belief and fond memory of its practice.

That Winter of 1987, as we planned for the spring planting, a young man came to the door carrying an

old-timer's gift. Our visitor, an Ojibway married to an Onondaga friend had something for the IPNC. An elder from one of the Seneca reserves had given him the 20-year-old seed of an ancient corn variety, the northeastern "pod" corn (*Zea Tunicata*), what Arthur Parker called "sacred or original" corn and what the old Seneca man called, "Delaware Grandfather corn." The ancient strain, we were told, was now hard to find, maybe in danger of extinction. No one was known to plant it anymore. The elder had quit farming himself and was concerned the Grandfather corn might die out. Only a small paper bag of seed survived in his line and that had been partially eaten by mice. He wanted to know if we would help sustain the "Grandfather," feeling that maybe the old corn has qualities "that someday the people will need." True to its name, the "grandfather" corn even looks old. It has a gnarled expression and each kernel is covered in its own husk. That winter, too, a knock at the door brought a small handbasket full of blue potatoes, another indigenous product. The crew at IPNC accepted both gifts and agreed to try bringing them up in 1988.

Season Journal, 1988:

May 28. Cresting the hill, you could smell the wet plowed earth and then what came to view was a seven-acre lay of land—a field of brown-black soil that seemed to roll on and on and it was just about the biggest field you could envision for a few busy people to cultivate. The plan called for plowing and planting three acres. That was already done. Plowing created its own enthusiasm on this one, something about cranking machines and muscular young men pitting themselves against the earth and overdoing it. Seven extra acres is a huge area to do by hand. Now the field must be planted, must be hoed and harvested.

June 6. The grandfather corn went in first last week, as promised. Then the blue potatoes. Finally, the big fields of white corn, by hand and by tractor. There is something about the old white corn. It is hard work planting it by hand, but as you go on, dropping the seed into the ground, it feels good and pulls something human in a person. It is dry, way dry for a late Ithaca Spring.

August 10. Almost two months without rain. Only consistently hot sun. Hay in the field looks pale yellow. The small plants on the big fields are also yellow. Everybody shakes their heads; it won't survive much longer and even then, it'll likely be stunted. A lot of the hybrid corn is already dead or stunted. Hoeing is more like scraping on the dry ground. Despite the drought, grandfather corn is up, purple-brown leaf holding up.

August 18. Rain four days ago. White corn field shot up about a foot. Green as can be, nice straight rows. Has one

*"To waste the product of corn
is to say that the effort it has
made is not important to us,
the human beings."*

deep root and others that arch like long fingers. All the corn is up. Grandfather rows very productive. Counting 56 ears from 26 hills.

September 15. Potatoes are ready. Fields of white corn are very, very big. A bit of despair today thinking how all the white corn might be picked. There is a lot of it. It amazes how after two months of no water, this beautiful looking field has come up. Now comes the overwhelming feeling it might be too much to pick for our small crew.

September 27. Among the company of Smithsonian speakers met Gary Nabhan, of the Desert Botanical Gardens. Talked on the grandfather corn, wondering about origins, and he pointed me to the pod corn of the highland Andes, which was bred for medicinal purposes, particularly respiratory ailments. According to Nabhan, this was observed by Hugh Cutler, who wrote about it in his 1940s essay, "Medicine Men and the Preservation of a Relic Gene in Maize." Writes Nabhan: "Over millennia, most farmers have likely destroyed or neglected this relic gene if it shows up in their cornfields, due to the extra work involved in maintaining it. Yet, Callahuayo and Quichuan medicine men have taken care of this relic gene, as well as carrying it with them to other cultures. These wandering South American herbalists are known to have reached into Central America historically." It made me wonder about the Grandfather corn, why it has been kept and what may be known about it. I also asked Arturo Warman about it. "I am sure it has survived for a reason," he said.

October 18. Have picked on the big fields for two weekends. Ten to twelve people working several sessions, mostly IPNC colleagues and Cornell students. Made a small dent in the field. Acres of picking to do yet. Have asked visitors to tell others to come pick. First over-plowing, then drought and now too much to pick. Will anything go right this season?

The journal record, always sporadic, stopped there. But the season progressed and for a time also the sense of despair (second cousin to enthusiasm) that a beautiful stand of corn might rot in the field.

It seemed high sacrilege. First, because of the work and energy involved in bringing the corn to full term.

Then, as conference speaker Roderico Teni remarked: "The spiritual connection is shown in the respect for the product of corn. Every kernel should be picked; it should all be used. To waste the product of corn is to say that the effort it has made is not important to us, the human beings."

Those expressions shown within native cultures toward the foods that sustain the people are deeply felt. All natural native cultures express appreciation and respect for the foods that give life. Attachment grows in the doing. The catch now is that modern life makes demands on our time that take us farther and farther from natural cycles. The frame of reference lags, demands of land and growing crops clash with paper schedules. Circling back to fit at least part of our lives into nature's season can traumatize. But truth is that as you work with the old corn, as you plant and nurture seedlings, as you hoe and clean, as you look upon a growing field, that feeling of attachment grows. The physical response of the earth is so selfless, so ancient and so giving, that a communication may be assumed in it.

You see it in kids who have lived in the city coming to inhabit country, how for the first season they stay close to home. Then, as the summers are counted, they go further and further into the woods, following brooks and deer trails, mixing fantasy and reality and letting that other world speak to them. Experience then overlaps the many contacts and out of that, connection. It does happen and it needn't be mystical or fearful, just real—real as watching lightning strike twice the same cottonwood or as sensing and hearing the humming of ten thousand bees, black as a cloud, flying over as you hoe a field, real as "the moccasin telegraph" which went to work on our corn-picking problem.

The Moccasin Telegraph, that seemingly clairvoyant Indian invention, is possibly the *only* invention not quite yet gifted over to the white brother. The Moccasin Telegraph is to Fax what corn mush—the original breakfast cereal—is to corn flakes. It carries substance. In this instance, Indian colleagues from SUNY-Buffalo doing a statewide round of meetings stopped by. In town to work on the New York State curriculum, they nevertheless picked corn and promised to pass the word that a field of Iroquois white corn was ready to pick. The invitation amounted to a "friendship offer," where a family, grateful for their own bounties, puts up a field for clansmen and friends.

Soon, a couple of traditional chiefs from Onondaga came up the driveway. They checked out the field and went to work, loading a pick-up. Big, pleasant men, they visited and told stories. Various feasts were coming up at home, they said, good to pick the corn. In recent years, the Onondaga have put up a new longhouse, pretty, log construction, well-lighted. There is not a whole lot of planting getting done on the reservations,

including Onondaga, but there is interest in it and many people support it, the men said. About the Grandfather corn, they had heard of it, but not often anymore. But they would "ask around the old people."

Next week came two clan matrons and a daughter, delightful visitors. Like the chiefs, they said hello, went to work several hours in the field, then visited longer over coffee and tea. They, too, had stories, teachings, about the corn and the culture surrounding it. So much of it is in the language, and in the attitude. The corn is a female, they said. She feeds us with her silky hair.

"There will be a time," one clanmother told us, "the people's minds will be so confused with evil and mindless things, she, corn, will want to leave us." She smiled. "I sure hope it's not yet." We heard many curious and intricate little stories. After a summer of severe heat, Fall of 1988 clocked record wind speeds for tropical storms and even the scientific world was apprehensive. Nature itself appeared to be changing. One clanmother had this to say, "Since the old times there have been ceremonies to bundle and throw away evil things. Given to the waters of swift currents, bad things are thus thrown to the deep of oceans, where the blind fish with over-sized mouths eat them to control them. Now," she said, "In the NATIONAL

GEOGRAPHIC, the old people have seen where fishermen with electronic nets are dragging up a fish like him, the big-mouthed, bottom-of-the-ocean one we were told about." She smiled, "It tells you something."

It was just the beginning then of knowing all the field would be picked. Another group came from Cattaraugus, twice, to pick. Then came a carload from Akwesasne. Then again from Onondaga, a busload of grade-schoolers from the Indian school there. The young students were hard workers. A couple of girls told of picking in "grandma's field back home." Later, more adults visited. A couple of the Mohawk families from the Native Self-Sufficiency Center, at Gray, New York, brought a crew to pick. The Native Self-Sufficiency group specializes in log-house construction (among other things). All in all, more than fifty people from the various traditional communities came by to pick and discuss corn and other crops—a friendly little network, to whom we dedicate this issue.

November 9. Walked the big cornfield on the hill. It is 99% picked. Season finished. Despair bundled and thrown. Here and there raccoons dragged some cobs into the woods and on a couple of edge rows you could see where deer got a few. Mother Earth tax.

José Barreiro

Tsiorasa at eight years, IPNC



Cosmological Importance of Corn Among Mayan Peoples

Roderico Teni

At the moment, our Kekchi people of Alta Verapaz are about 500,000. We are one of twenty-two Indian ethnias throughout the whole of Guatemala, where there are some six to seven million indigenous people who are Mayan. The non-Indian people, mostly of European descent but also including a small percentage of African descendants, number about three million or so.

From the beginning of time, our Indian ancestors spoke to us about corn. In our sacred book that remains with us, the *Pop-wuj*, sacred book of the Maya, two of our original people, Hunahpu and Xbalanque, speak to

their children about the raising of corn. In more recent times, we've come to a deeper understanding that our ancestors had a great knowledge base about agriculture. We have some surviving books from that time that we still look to but, in fact, the larger number of books that our people had developed were burned by early missionaries and so we lost a great deal of knowledge that is unlikely to be recovered.

The *Pop-wuj* has a lot in it that merits attention. The early translation of the *Pop-wuj* was done by a Franciscan friar, Francisco Jimenez, over two centuries ago. A more recent translation was done by a Quiche



Mayan agronomist teaching Cakchiguel children, San Jose Poaquil, 1976.

Indian scholar, Adrian Chavez, and there is a distinction between the translations in terms of the conceptual framework that the indigenous Chavez got out of the original text as opposed to the earlier translation by the Spanish priest. This teaches us that all peoples have their own culture and their own worldview and that all peoples of the world develop major crops that are a legacy to humanity. In that context, the indigenous peoples of the Americas developed corn as a major staple, the Asian peoples developed rice, the European peoples developed wheat, the African peoples lived from millet and sorghum.

Presently, corn continues to be developed by Mayan people and it certainly has developed in other parts of the world. At first, there was a barrier to the use of corn: in the early contact there was discrimination against this food stuff and it was relegated to use as an animal feed. The Indian people didn't pay particular attention to this discrimination and continued to grow their corn because it was a central part of their lives. To this day, the choosing of the field in the area to be planted is done in the old manner. In the communities of my area the corn cycle begins in January or February of the year. The head of the family, usually accompanied by a ceremonial priest, will do the choosing with a great deal of respect and solemnity. The ceremonial priest and the family gather for an all night ceremony the night before the choosing of the field in order to connect with the natural world around the area—the spirits of the valley and of the mountains—and in order to ask for protection for their crop so the wind and the rains will come at the right time and foraging animals will leave the food that is destined for human beings.

As the sun rises in the east, the principals gather in the field that they have selected and begin their invocation by facing east and the rising sun. In the spiritual context they request strength and protection for the being that is to be born, which is corn. They ask permission of the spirits on behalf of this being so that, as they disturb the natural vegetation of the place—they need to clear some land—they won't incur the wrath of the tree spirits and the other vegetation that they must disturb in order to plant. After the initial ceremony while the sun rises, they then return to their home, where they are met by other members of the community who will have naturally gathered at the home of the family that is going to plant that particular day. Together, as a group, they then clear and prepare the field for burning.

These days, some people who may gather to observe us doing this may think: how stupid are these Indians who are going about it this way—why are they working in a way that appears to be old and primitive? In fact, everything that is done—the preparation for the burning, the smoke itself from this initial burning of the

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field—is significant within the culture and has its meaning. The purpose of the burning is to warm the earth and in that way move aside some of the insect and animal life that will come with the humidity and affect the crop. And the ash that is left from the burning enriches the soil.

Our people usually choose the seed that is in the thickest part of the ear. The seed is chosen with the utmost care so that the heart of the kernel is not diseased. In some of the areas, the seed is prepared two or three days before the planting; other places it is done the day before the planting. This is done at this time for two purposes: first, there is a lengthy ceremony that goes with the choosing of the seed and happens immediately before the planting, and secondly, because the seed should be fresh off the ear so as to prevent other kinds of disease. The host family will feed the people who come to help on the morning of the planting—they will offer a broth made out of the corn itself, *atole*; they will also sacrifice some chickens and also make a broth out of hot chili peppers.

Naturally, the word spreads throughout the community that a planting is going to happen—in a specific place, a specific family—so people begin to gather from all around, sometimes 30, 40, 50 people, sometimes many more, depending on the size of the field. The idea is to plant it all in one day, whatever the size of the field. The concept of a cooperative does not really exist within our culture; it's done in a more fundamental plane of a shared spirituality they have about what they are about to do.

The instruments for planting are a planting stick—a long stick with a sharp, hard end that has been charred—a holding pouch for the seed, the machete and the hoe. There is a reluctance to use a tractor because it tends to crush, to harm the earth. This often goes against the feeling of the people for what they are about to do and the influence of the type of fields they plant in, which are quite rocky. The planting of corn—in my language the word for it is *awok*—is done in the same field for only two or three years. Then the earth is allowed to recover. Presently, it is not as possible to rotate land because the great majority of people don't have enough land to rotate. But they think the earth should be allowed to rest after a harvest in the same manner that a woman must be allowed to rest after giving birth. By our custom, a woman, after giving birth, is made to rest for 30 to 40 days. This is done to allow her recovery and to insure that there are no problems in giving birth again in the future. The people feel the same about the earth and so are inclined to let it rest. During the time of rest from corn, the earth is sometimes planted with beans or squash, especially beans in order to help recover the nutrients.

On the day of planting, the corn is planted in rows determined by sightlines, and during planting the ceremonial priest will ask continually for the protection of the crop from animals and that it will be allowed to grow healthily. They invoke the natural elements in order to control the winds and to bring the rains at the appropriate moment—this again is similar to the kinds of invocations made for a woman at the time of pregnancy and birth, requesting protection for the offspring so it is born healthy. In that sense, corn is looked on as a living being, as a child might be, in the same way as us humans—a being that can suffer, that can talk with us, that can cry.

During the time that the corn is in the earth and has not sprouted—the time that it is in the darkness, as they say—the prayer is to bring the rains at the appropriate moment. Again, this is related to pregnancy—when the child is still in darkness. During the day of planting—and, as I said, the intent is to plant in one day, to have enough people to be able to fulfill that task—they are also fed a lunch that has a ceremonial aspect: a bean tamale and tortillas. The time of planting is seen as a very happy time. The people are to come there and to be fed well, to be able to drink cocoa and to be able to take home whatever they cannot eat to feed their families. There is also music and festivities during the lunch—they play the harp, the flute—and again it's seen as a very happy occasion.

Good seed will grow fast and the rains are important at this moment. Then comes the time of the first cleaning, as they call it, the first hoeing—in my language, *ahink*. In the lowlands, where it's hot, they plant twice a year; in the highlands, where it's somewhat colder, they plant once. So, at this time, they will do the first hoeing and the weeds that are cut will be placed around the corn plant in order to feed it. There is a lot of care taken, again, so animals don't eat the early plants. The hoeing is what allows the plant to grow faster during this time—10 to 13 weeks before the ear forms.

When the corn begins to dry, to lose its greenness and become yellow in the sun, they know the time is coming for harvest. As the different fields are ripening the word will spread throughout the community in the same way and people will come to help with the harvest. Again people work communally—there is no salary involved. As they harvest together, they braid the corn and take it to the home of the people whose field they are working. The ears will be braided, 12 or 13 together in bunches, and generally hung from the rafters.

In ceremony, the people then give thanks to the corn to invoke their good feeling for the harvest. It is especially important in the home during this time that there not be any kind of squabbles or any kind of internal friction because it would be a way of not appreciating the gift. This is important as it protects the

Naturally, the word spreads throughout the community that a planting is going to happen. Many people gather. The idea is to plant the field in one day.



Communal planting, Kekchi region, 1984.

They ask permission of the spirits on behalf of this being so that, as they disturb the natural vegetation of the place ... they won't incur the wrath of the tree spirits and the other vegetation that they must disturb in order to plant.



Cakchiquel women washing corn.

harvest from rot and other ways it could be attacked. There is a slow fire that is made in the home and the rising smoke is used to harden the ears so that rot won't set in.

Eight days after storing the harvest, the family, by themselves, will go to the field again to gather anything that might have been left. It is considered disrespectful to leave ears, or even grains of corn in the field. This is done so that the connection that has been made is in no way disrupted—the spiritual connection to what they call the Heart of the Sky. It is seen as the need to make good on the request to the spirit to protect. If this is not done right—if there is waste of corn in the field—it is believed that the element of planting for that family begins to diminish and over the years the harvest will not be as good. The family itself will suffer because the meaning of corn, family and harvest is interrelated. In the same way that the family, the relatives, must be attentive to a birthing woman's needs and the needs of

the kids that she is not able to care for—they will pay attention to all that. If that is not done, obviously, the children will also suffer. Especially a newborn that is not cared for properly will suffer. The strength of the family will then diminish—so this is an important part of the process.

As the process for one family is completed, the members of that family, especially the head of the family, are expected to go to the next family that is ready to plant or harvest, as the case may be, so there is a mutual sharing of labor. Again, there is no salary, although people receive a great deal of corn—they take home part of the harvest.

The attention of the principal woman of the house is important at this time. She will ordinarily prepare a *mixtamal*, a tamale, with the ashes of her fire and she will take the corn and grind it in her *metate*, a stone bowl with three legs. They will make a hard tortilla that is toasted. This is food for travelers; they'll make a lot of this. For the traveler, this toasted tortilla is good food

and lasts three or four months without spoiling, so there is not as much need for refrigeration. As the tortilla is cooked, the skin begins to bubble and when it is dry, the tortilla is done. This is the main food for our people: corn, beans and chilis are put on it and in modern times also salt.

In the traditional context, during this time after the harvest the adults dedicate themselves to a number of other activities. During these times the Mayans developed their observational powers in astronomy and developed the sciences that we were known for. This gives an indication of the spirituality that is inside of the corn cycle. For our people, it has its time element and this is reflected in the continuity, the survival, of the Mayan calendar, which is a religion in itself.

This way of being for the Indian people is based on the knowledge that corn is alive, the corn feels and it cries. This is not easily lost and continues to this day. It's very important because life itself, culture and nutrition revolve around this food. It symbolizes the continuity and the importance of the cycle for the family—the maintenance of family and, more than family, of the larger extended community. So the sharing through these meals at these various stages maintains the people's contact with each other. There is an encouragement of the corn cycle year by year—the abundance of corn brings happiness, prosperity and health; the lack of corn brings hunger and death. Today, some of the people have asked, "Why is there a decline in the corn?" The response is: "Because we are being invaded by chemical fertilizers." This is what the elders say—they have seen that the use of foreign elements ultimately contributes to a decline and hurts the Earth.

So our own culture continues to play a role. These cycles continue, and are important to the Mayan people. They signify the need to continue to learn more and have more respect among various cultures and peoples. Every culture should have its ways of being respected. But during the times of the conquests and right to the present day—now in some even more traumatic ways—there is still a disrespect for the ways in which the Indian people have approached corn and the other ways of being. There is a spirituality that remains alive; this continues and it won't cease to continue as long as we are alive as a people. There has been a great deal of prejudice against this way of being by the colonizing influence—that, too, continues—but as other people have said and I would like to repeat: if ever America as a continent is to give solutions to the world, if ever America is to give an answer to the world, it won't be the legacy of the colonies or the conquest—it will come through the legacy of the Indian philosophies and the ways of being of the Indian people of the Americas. •

Translation: Jose Barreiro

Corn is looked on as a living being, as a child might be, in the same way as us humans—a being that can suffer, that can talk with us, that can cry.



*"Humans made of corn"
Cakchiquel Country*

Maize as Organizing Principle

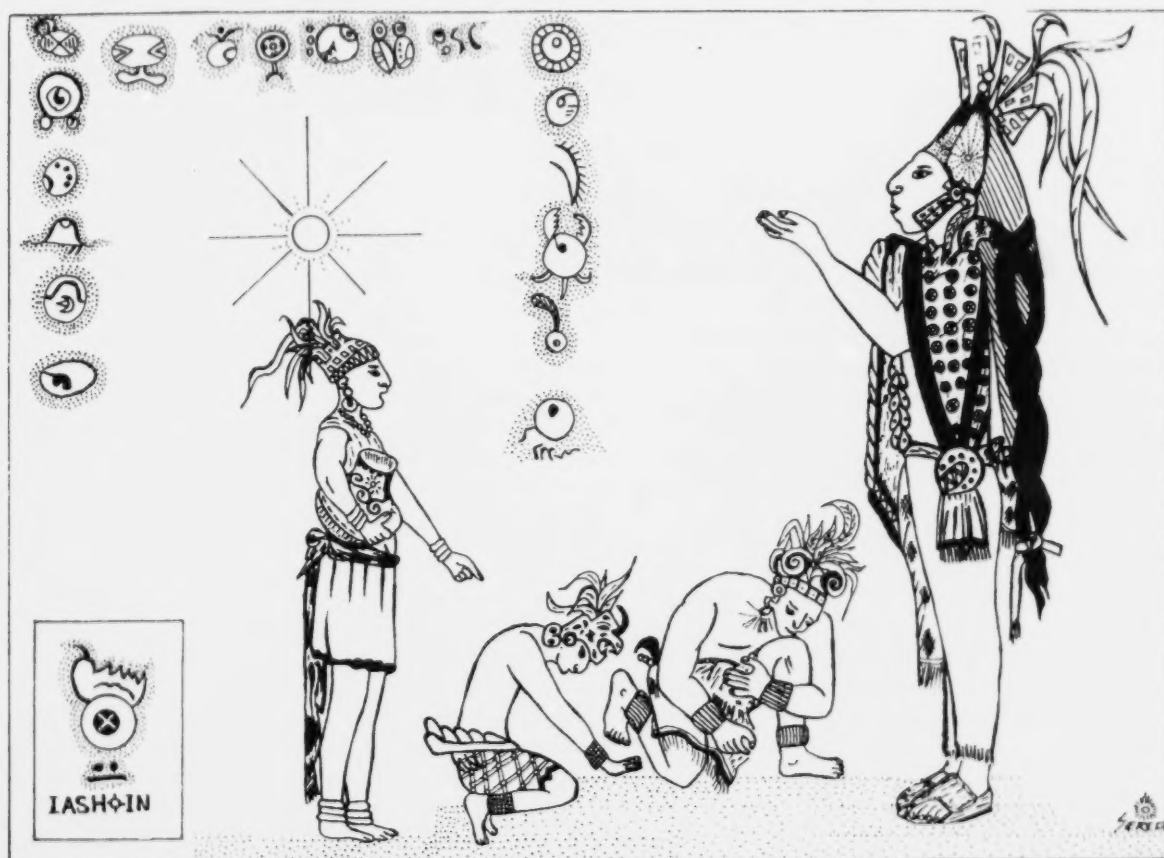
How Corn Shaped Space, Time and Relationships in the New World

Arturo Warman

We don't know for certain if Christopher Columbus found maize in Hispaniola (today Haiti/Dominican Republic) or in Cuba. But he did find it in his first trip to the New World. Later on, every explorer, every pioneer, every colonizer found maize all over the Americas. Today we know that maize was cultivated in Columbus's time from about 1000 km, about 600 miles, south of Santiago, Chile, up to Montreal in Canada. This is almost 10,000 kilometers in a direct line. Between these two extreme points in the geography of corn, there was an incredible amount of variety of natural conditions: some of the highest altitudes humans

occupy, in the Andes; some of the driest deserts in the world; tropical forests with more than 200 inches of rain per year; and high plateaus with very dry and very rainy seasons. In all of these varieties of natural conditions, maize was present.

And it was present in many forms. The maize plant, even when it is a single species according to its botanical classification, had many varieties. You could find maize three feet high—the famous chapalote of the deserts of North America—to maize with stalks more than 12 feet high. You could find ears of corn five to six inches long to some that are 30 to 45 inches long. The size of the grains also had a great variety, from the



What the Europeans found in the Americas was not a plant, it was a cultural invention, the product of the initiative of millions of people for thousands of years that produced a treasury of genetic knowledge.

standard kind of grain or smaller to the grains of Cuzco, that are more than one inch in diameter and are eaten one by one. This extreme variety had adaptive purposes to the extreme diversity of the natural environment. No other plant, especially no other cereal, was cultivated in such a wide area between north and south. It was the only cereal that was widely used in the two hemispheres.

The variety of the corn plant also corresponded to the extreme diversity of the uses that maize had in the New World. Maize was a basic staple in some parts of the continent. It was a beverage, an alcoholic drink, in the Andean region and it played a important role in the ceremonial life in that area of the world. Maize was a vegetable when it was eaten on the cob; it was transformed into oil and into starch in many parts of Pre-Columbian America. Many of the chronicles of the discoverers express amazement at the variety of uses of maize in the New World. Jose de Acosta, Jesuit priest, wrote in 1590 that maize was, in the Americas, bread, wine and oil—the basic staples of the Mediterranean culture which Acosta knew well.

Maize was more than that in the Americas. Maize was food, of course, and thus part of the daily life, but it was also part of the sacred life, was part of the mythologies of the New World, was part of the identity between man and nature in the New World. In many parts of the Americas, maize was the basic plant, the basic staple and also the basic force that organized space—selecting where you could plant, where you could move under the itinerant systems of cultivation, where the people could establish their town to be near the maize fields. Space was organized in the mountains according to altitude in such a way that maize could combine with some other plants in different stages in this vertical organization of the land. Time was also organized by maize: by the seasons of planting, by the seasons of cultivating, by the seasons of growth. Maize had an organizing force in Indian America.

When we speak of maize in the Americas we have to drown out the idea of maize as a mono-cultigen. Maize was always in combination with some other plants; maize almost never grew alone in the field. It was part of a technological tradition that used diversity against specialization. Diversity was its strength; it was the way to confront difficult and sometimes hostile natural

environments. Diversity was the way to live near the natural environment and not to fight with it as with specialization. In no place has nature established only one plant; nature always combines different plants in the same area. Only humans, through specialization, have introduced only one plant in the soil, in the land. But this was not the tradition in ancient America.

Maize was the collective invention of millions of people over several millennia in this continent. I use the term "invention" because maize does not exist naturally. Because of the cob, maize cannot reproduce itself in natural conditions. If maize is left to reproduce alone, it will die in a few generations because all the seeds lie together and compete until they don't produce viable plants. Maize is a human invention because dispersing the grains made maize possible. According to today's scientific theories, maize was the product of genetic mutation called catastrophic sexual transmutation. In any other condition in which human culture was not present, maize wouldn't have become what it is. But human beings took the seeds and dispersed them and took care of them and produced this miraculous plant. They produced it to grow in harmony with nature, to live according to their beliefs.

What the Europeans found in the Americas was not only a plant, it was a cultural invention, the product of the initiative of millions of people for thousands of years that produced a treasury of genetic knowledge. The genetic value, this knowledge, was so amazing that maize was, and is today, the most productive among the cereals. And cereals represent today more than half of the food for mankind. In the time of the contact between the New and the Old World, the yield was measured as a relation between the amount of seed planted and the amount of seed collected. In Europe, the standard yield for the Old World cereals was six units of seed collected for each unit of seed planted. In some very good conditions, such as in the Netherlands, this ratio could be 10 to 1. But in some other conditions, it could be reduced to 4 to 1, as in the Castillian areas. The standard ratio of maize, on the other hand, was 150 units of product to 1 unit of seed. In bad years, when rain was scarce, maize could drop its yield to 70 to 1. That means ten times more than the standard yield in Europe at the same time. And in some areas, yield in maize was 800 to

1—something that no peasant in Europe could dream of. Maize was, because of this accumulation of knowledge, accumulation of effort, accumulation of experimentation, the most productive cereal in the world. It is still so today—no other cereal has the world average that maize has—and no other country obtains the yield average of corn that the United States does.

This, of course, attracted the attention of the conquerors of the Old World. They found in this plant a kind of goldmine. I use this example because the value of the maize crop in the world today is higher than all the silver and gold taken by the Spanish and Portuguese during the whole of the Colonial period. Every year the value of maize in the world, if we use American prices, will exceed \$200 billion. All the gold and silver could not reach this amount. And this productivity was one of the reasons that in less than forty years after the contact of the Old and New Worlds, maize was present in all the continents, with the exception of Oceania and its surrounding islands.

In China, maize arrived in about 1540, give or take 15 years. This is not amazing—China had the most developed agriculture in the world at this time. In China, scholars had very precise agricultural statistics and great curiosity and ingenuity about plants from

other parts of the world. Agricultural experimentation was far more advanced in China than in any other part of the world at the time. But maize was not introduced into China by the scholarly community; it was introduced by the people of the hills. These hills, these slopes from the Himalayan mountains had similar conditions to some of the conditions in which maize was grown in America. Maybe we will never know how it happened but in less than forty years, people in the slopes of the Himalayan mountains were cultivating maize before the scholars of the Chinese Empire were experimenting with it in their botanical gardens.

In 1513, we find evidence that maize was present in the west coast of Africa. We don't know if this maize was imported from America or was cultivated in Africa but in 1540 there is no doubt—maize was cultivated in Africa. The Portuguese introduced this plant with a specific purpose: to supply the ships devoted to the trans-Atlantic trade of slaves. Maize became and remained for three centuries the staple of the trade of slaves between Africa and the New World.

In Europe, in 1525, maize was present and had a price at some of the markets in Coimbra, in Portugal; in Udine, in Italy and very probably also in Seville. The price of maize in these markets was between half and



Mayan (Cakchiquel) market, San Jose Poaquil

two-thirds of the price of wheat. So poor people could afford this food; people who couldn't pay for wheat were able to pay for maize in Europe.

In each of these three continents, maize had a different role and these different roles can illustrate the basic organizing principles that maize played in the New World. In China, maize was a conqueror of place. Space that couldn't be devoted to agriculture according to Chinese technology was incorporated with the presence and the use of maize. In China, the basic staple had been, historically, rice for the southern part and wheat for the northern part. Rice was cultivated in paddies, through irrigation in flatlands. Wheat was a rain-fed plant of the northern part and was a northern crop. It was usually planted in September-October and harvested in June-July of the next year. The hills in southern China that couldn't be used for rice were kept with no other economic use. When maize was introduced as a large crop, all these areas in central China that lay fallow for thousands of years became areas to obtain food.

Maize in China was always human food; it is even today and China is the second largest producer of maize in the world, the first being the United States. Almost 30 million tons of maize are consumed by Chinese people every year. The expansion of maize came at the same time that the demographic explosion began in China, in the 18th century. In the 18th century, China did not have more than 100 million inhabitants, less than 10% of today's population. Maize was one of the resources that made, according to one proposal, these demographic explosions possible and, according to a second proposal, was the cause of this expansion. There are two demographic schools of thought. One, derived from Malthus, states that population is an independent force—that it establishes its own destiny and people will have to find food for this external dynamic of population. For the other school, food availability produces demographic expansion: if there is no availability of food, populations will not grow. So we can say, in China, maize was the cause or one of the important factors that made possible population expansion at rates that were previously unknown.

In Africa, in the 16th century, maize was one of the resources for the population. It was planted and cultivated for the slave trade. It was used because it presented several advantages as opposed to other staples. One of the advantages was productivity: maize yielded more than the traditional African staples, principally sorghum and millet. It yielded more than rice that was introduced into Africa around the 15th century. And it yielded more and was a lot cheaper than wheat. Of course, the slave trade was a business and good business commands minimum cost, maximum profit. Maize had the minimum cost and had some other advantages as well.

The value of the maize crop in the world today is higher than all the silver and gold taken by the Spanish and Portuguese during the whole of the Colonial period.

The great risk during the Atlantic passage was scurvy. In ships that had around 20 tons of displacement, 250 slaves were transported in each trip. They were packed into small spaces that resembled small tombs; Portuguese vessels were called *tombeiros*, from the word tomb. In this condition, scurvy was a real risk. Maize has the vitamin that prevents scurvy. It's not present in wheat and it's one of the reasons, in so many travels by Europeans in which wheat was the staple, scurvy appeared. In the trans-Atlantic passage, scurvy was rare.

Maize has another advantage: it's a very compact grain. So you have more nutrients in less space and this was very important to the trans-Atlantic passage. Even today, maize is the only cereal that can feed cattle requiring only a sugarcane complement. Any other cereal, any other grain requires a lot of complements to be able to feed cattle. Maize has this concentrated compactness naturally. And that was of great value to the slave ships which needed space.

So, maize was the grain of slavery. In the Americas, maize became the staple of the slaves, from the United States to Brazil. In the United States, the three M's: maize meal, meat and molasses, were the standard diet of the slaves. They received one peck of maize every week; that means one quarter of a bushel, almost two pounds of maize per day. This was the standard supplied to the slaves in the United States. And it was almost the same in the Caribbean, in Brazil—the colony that received the most slaves in colonial times—in fact, all over the Americas. In Africa, maize became, because of these same conditions, the staple of war and war was needed to obtain slaves. It became the food of the armies looking for slaves. They could travel longer with this grain and they needed to travel longer because the potential for slaving along the coast was becoming more scarce each time. War was introduced over the whole African continent, in the search for slaves. Slaves were

*Maize was transformed from
food to raw materials for
industry and from food for poor
people to feed for animals.*

paid for with firearms; firearms to perpetuate war and obtain more slaves. More than ten million Africans reached the new continent as slaves. We know that maybe fourteen million left the African shores and four million died in the passage. But we shall never know how many Africans died in these wars inside the continent in the pursuit of new slaves.

After slavery, maize became the staple of colonization, of colonial domination in Africa. It became the staple of forced labor in Africa that the colonial powers needed to develop mining, to build ports, to build railroads. African workers under colonial situations and African armies received daily supplies of maize; it became their staple. Later on, maize became the most important staple in tropical Africa. It is today; but today, Africa cannot produce enough maize for its population and depends heavily on other countries of the world and on imports from the United States.

In Europe, the most densely populated continent, there was no space for maize to conquer. The agricultural frontier in the latitudes in which maize could be introduced were already claimed. There were no new fallow lands, no idle lands. But it conquered time. The traditional cereals of Europe—wheat, barley, rye—were winter or spring crops: they were planted before the winter and harvested before the summer. Few crops could make use of the rest of the year. The summer cereals—millet and sorghum—had low yields in Europe. Maize had a high yield and it occupied the time between the crops of the Old World cereals. It became a conqueror of time.

The poor people of Europe used maize more than any other cereal. Until the end of the 19th century, maize was primarily a human food. It was used so much that it caused pellagra. Today pellagra is almost forgotten, but people who can remember the 1920s and 30s remember that pellagra was considered a national risk in southern Europe. And pellagra was one of the marks of poverty in the southern United States. In southern Europe, pellagra became the disease of the poor people. It was a dangerous disease that in the end produced dementia and death. It was called the "Three D's" because the symptoms were diarrhea, dermatitis and dementia, the last one being almost always fatal.

Maize was thought to cause pellagra. In 19th century Europe and for many years in the United States, pellagra was considered as the malady of maize. A team of American researchers of the Public Health Service, headed by Joseph Goldberger in the 1920s, established and proved that maize has a deficiency in niacin—it was called nicotenic acid then—and in triptophan. [See *Goldberger on Pellagra*. ed. & with intro. by Milton Torris. Baton Rouge: LSU Press, 1964.] Every food has its deficiencies; there is nothing that has no deficiency. If people eat one single food, the deficiency will show

It's also amazing that glucose is chemically identical to the sugar in human blood. That is why it's used in medical purposes—serums are produced with glucose. Once I was telling this to a Mexican peasant friend and he said, "Why is that amazing? Maize is our kin."

itself: pellagra in the case of maize, scurvy in the case of wheat, avitaminosis in the case of rice. This is the normal condition of food—to be incomplete. There is only one way to have a complete diet and that is diversity.

So pellagra, as Goldberger established, was more the sickness of poverty than the sickness of maize. And in Europe, more than one quarter of a million people acquired pellagra between 1850 and 1900. In the United States, almost the same amount of people acquired pellagra between 1909, the year pellagra was found, and the New Deal, during which the synthetic amino acid triptophan and the synthetic vitamin niacin were made available. Pellagra now is a clinical curiosity in the United States but it is not in Africa, where endemic pellagra is still present and it's not a clinical curiosity in some other parts of the world.

Maize became one of the resources of the military, economic, and demographic expansion of Europe. When this expansion reached all the land available, maize transformed itself into the most modern of all crops, the most modern of all cereals. Of all the cereals of mankind, maize is the only one that is widely used as *materia prima*, as raw material for industry. Maize is transformed into several hundred different products that are used by industry, primarily by the food industry, but also by the pharmaceutical industry, by the oil industry, and by the explosives industry. Maize was transformed from food to raw materials for industry and from food for poor people to feed for animals. More than half of today's production of maize is devoted to feeding animals, especially in the United States. The United States is the largest producer and exporter of maize—half of the world's production is harvested in the United States; two-thirds of the world's exports come from the United States.

The United States is corn country—not only in Indian times; it's corn country today. Today, maize accounts for the same foreign income as wheat—the traditional export of the United States. Maize is really the backbone of what has been called food power: the use of food by the United States as a weapon in the political arena. Some political candidates say, "I will not

use food as your party has done," and the other candidates say almost the same. Many politicians have sworn that they will not use food as a political weapon but they have used it. Millions of people depend upon the import of food from the United States. Maize, in this country, occupies more than half of the total harvested area in agriculture. Its production is more than three times higher than all the other cereals together. Its yield is three times higher than wheat. As a raw material, as a feed and as a grain, it's really the main support of food power.

Maize was not a natural miracle; maize was a human creation made possible through human intervention. So we have maize as a cultural product. But maize is also diversity and diversity means knowledge and experimentation. It requires cultural effort to select and to domesticate varieties to be more useful. Let's remember the origin of this miracle and keep maize as the hope of humanity and not as a threat. Let's give back maize to humanity—that requires, of course, a lot of imagination that I do not have. And a lot of effort that we must do together.



Aztec corn goddess.

In 1974, almost all over the United States, one single variety of maize was planted and this variety was susceptible to a fungus disease. The amount of the crop that was lost because of this lack of variety in the seed plant was more than the consumption of China, Mexico and Latin America together.

Questions and Answers

Q: Considering the slave trade, what was the role of maize in the Caribbean?

Warman: Yucca, compared with maize, needs more volume, more weight to give the same amount of nutrients. So, if you take what today's people in the Caribbean eat according to weight, yucca will be the foremost staple food. If you take it according to nutrition, maize will be at the same level as yucca. Yucca and maize are together in the Caribbean islands. In a great part of the Caribbean, maize is used as meal—harina, cornmeal, that is present even in the yucca bread. So I take a little bit of an exception when people say: this is the area of the potato, this is the area of maize, this is the area of yucca. Maize was mixed with yucca, beans, potatoes, and this diversity is important to recover from the past.

Q: When maize was brought to China and some of the other areas of the world, were the uses similar to the Native American traditional uses: alcohol, beverages, as a meal, as sweet corn? Did this diversity occur, did selections go on?

Warman: Yes, with one exception: the tradition of the Meso-American tortilla did not travel with maize. This is important because the tortilla requires a peculiar preparation in which corn grains are boiled with an alkaline substance. After this boiling, the wet maize is milled and tortillas are prepared with masa. It's amazing that what scientists called alkaline hydrolysis has the consequence of making the niacin and the triptophan more available for human consumption. So when you have tortillas you don't have pellagra because in maize, niacin and triptophan are bonded—this is scientific language—in macro-molecules. Alkaline hydrolysis has the capability to break this macro-molecule and make niacin and triptophan more available. It's a shame that this tradition for consumption did not travel to other parts of the world;

maybe pellagra could have been avoided.

In Europe, the dry grain was milled and it was the coarse meal, that in the United States was called hominy. In China, with the incredible diversity of the Chinese cuisine, maize was incorporated at the same time as sweet potatoes and peanuts. The three travelled together to China, because maize never travelled alone. It didn't like to travel by itself; it's always together with one or more American plants.

And it's used to produce beer, of course. In the United States, this tradition evolved into maize (corn) whisky that became the national drink during the 19th century. Some estimations of per capita consumption of whisky suggest that every American around 1890 drank the same amount of maize that each Mexican ate.

The industrial transformation of maize began in the United States. Again the industrial transformation of maize is based on this alkaline hydrolysis and its basic product is starch—from starch you obtain glucose. It's also amazing that glucose is chemically identical to the sugar in human blood. That is why it's used in medical purposes—serums are produced with glucose. Once I was telling this to a Mexican peasant friend and he said, "Why is that amazing? Maize is our kin." For him, it was not amazing; it was natural that maize was the closest plant to human beings. So, diversity travelled, but not completely. In every country, culture and technology transformed the maize into different kinds of meals, different kinds of uses. So the variety of maize use is a lot greater than even 500 years ago.

Q: Will you comment on the future of maize? The number of varieties is declining and also, in many countries such as Mexico, the numbers of producers of maize is declining in relative terms as producers are turning to other products like sorghum or wheat or perhaps a more commercial product like vegetables or fruits. So, what is the future of maize as the organizer of space and time in the Americas—specifically among native peoples?

Warman: There are different scenarios—all of them possible. One possible future of maize is to become the

fuel of American cars. The American Congress passed an act, and it's still valid, that will protect the production and transformation of maize into alcohol to produce gasohol. This scenario was envisioned in 1972 during the oil crisis. So maybe you will burn maize in cars and people all over the world will have to find another staple or drink gasohol.

There is another scenario that is worse. In 1974, almost all over the United States, one single variety of maize was planted and this variety was susceptible to a fungus disease. The amount of the crop that was lost because of this lack of variety in the seed plant was more than the consumption of China, Mexico and Latin America together. The United States has developed a consciousness about this problem and the largest genetic banks are kept in the United States and the largest experiments are financed by the United States. So the United States is trying to prevent this but they are trying by themselves with little or no cooperation at all with the countries in which these varieties are alive and are part of the peasant tradition, part of the peasant culture. So maybe this worst case scenario in which maize will perish through specialization in the varieties could be avoided. There are several ways to avoid it and maybe the way that the United States is trying seems a more expensive and, I would say, selfish way of preserving this plant.

There is a third scenario: that maybe with the burden of the debt of the Third World diminishing, countries like Mexico will be able to increase their production and won't need to import from the United States. Maybe self-sufficiency could be another way to approach the problems of diversity. Let me use an anecdote. What the United States sells to the international market is called Yellow Corn #2. According to the classification of the FDA, it's not convenient for human use; it's basically a feed for animals. I agree—in Mexico we ate it and it was not fit for human food, especially in the form of tortillas. So maybe diversity is the best answer to these kinds of problems; to keep diversity with the participation of the people in their own decisions.

Q: There is one theory that corn came into the area of what we call the United States from South or Central America. Do you agree or disagree with that idea?

Warman: I'm an anthropologist so I don't have a strong opinion because this is the field of scientists. But Richard McNeish, an archaeologist, made excavations in Northern America, especially in Bat Cave in New Mexico and he found maybe the oldest remains of maize in the United States, dated about 3,500 B.C. It was already cultivated maize. The size of the cob was very small but it was cultivated. He didn't find any earlier evidence of maize in what is today the United States.

McNeish and Dick later on made excavations in

Mayan Corn Farmers, 1976.



Chiapas and in Guatemala and they found the same: that maize was present in 3,500 B.C. and it was also cultivated maize. So they decided that the origin must be in the middle. And McNeish made excavations in the Teohuacan Valley in the southern part of Mexico and he found maize that he dated about 5,000 B.C. And he believed that what he had found in these early stages—some cobs no larger than one inch—was the wild maize, the natural form of maize. But later on several scientists have established, according to my anthropological opinion, quite satisfactorily, that it was already cultivated maize. So it was not wild corn. This is the oldest presence of maize. However, Teohuacan cannot explain all the changes in the development of maize from this very small cob to the actual size of the cobs that appear in Teohuacan around 2,000 B.C. So, McNeish believes that it was a large area of central Mexico that participated in this collective invention of maize. That no precise area or no precise people could claim the invention of maize. It was a dispersed and collective phenomena.

Indian Corn Agriculture

A Puzzle for the 21st Century

Jorge Quintana

I want to first talk a little today about generalities in agriculture and then I am going to dedicate a little of the time to talk about an agricultural case in indigenous communities in Nicaragua.

To start with, I will mention some examples that we may find when we travel through the Indian country of America. Just last night, I was watching a program on TV about some gold pieces done by Indian nations in Colombia, beautiful works melted down and sent to Spain. Now, modern smiths are wondering how this work was ever done by Indians, because the craft involved in these golden pieces is something that even with the new technologies is nearly impossible to reproduce now.

There is another example in the Andes where, on the top of a mountain, there are large constructions put up by Quechua Indians, placing big stones on the slope of the mountain. How they cut the blocks from the side of the mountain? Four sides of the block are, understandably, fairly easily cut. But the fifth, the back side—that one is hard to imagine. Then there is the question of how they took those heavy blocks to the top

of the mountain. This doesn't have any relationship with agriculture or even with corn, but it has a relationship with the way we see what Indian technology or Indian advancement in science was at that moment when the European invaded the continent. There is so much that we don't know as we now begin to explore Indian technologies.

Yesterday I was talking with Roderico Teni, whom we heard this morning, and he told me how the *Pop-wuj* (sacred book of the Maya) mentions a legend about how the hair on the ears of the corn were put inside bags and this way the ancient Maya would reproduce a lot of corn ears with different qualities and different characteristics that would adapt to different environments. An old story like that may be considered a superstition, but if you have a little knowledge of plant breeding, you can see that it describes a method quite similar to the current breeding of corn and of other plants. Technicians will cover the tassel with a brown bag, and thus collect the pollen. Then they put this bag over the corn ear in order to fertilize it and to obtain the characteristics they want in their plant variety.

There is a lot of this type of knowledge out in the Indian Country. If we make respectful efforts to reach toward that knowledge we may find out that much of what has been derided as indigenous superstition has valid scientific basis. That said, I will go on to my actual talk for this afternoon.

We are called "Men of Corn." For millions of Indian descendants living in Mexico and Central America that statement is literally true. The Mayan *Popol Vuh* teaches us that we were made from corn. For many other Indian cultures in North and South America, corn has a vital role in both religion and nutrition. Another important aspect of corn is its function as the main pivot in an ecologically-sound agricultural system.

Through the new technologies developed within Western science, industrialized farms now can produce high yield hybrids. The rich yields of the improved hybrids may be out of reach by using any of the indigenous varieties that exist on the continent, but they also represent a problem. In order to obtain this high

If we make respectful efforts to reach toward that knowledge we may find out that much of what has been derided as indigenous superstition has valid scientific basis.

yield, you have to use high amounts of several inputs, including fertilizers and pesticides, most of which have proved to be harmful to the environment and to the human and other species on earth.

These high-input hybrids have another inconvenience: they are specific for some conditions. When a new pest or a new disease appears, often a hybrid does not have any tolerance or resistance to this new pest or disease. The crop is actually wiped out and the yields become almost zero. That doesn't happen with indigenous varieties. They may yield only 60% of the yield of the improved variety, but under adverse conditions, the indigenous yield may only drop around 20%, as opposed to 90% or 100% for the hybrids.

Those are some of the points that have to be taken into account when we consider the cropping of a high yield hybrid as opposed to the indigenous varieties. The other aspect is that the main focus for this type of improved agriculture is to have high yield in order to maximize monetary profit. And, it is true that with the high yield hybrids farmers have obtained high yields and some of them, high monetary profit, but we have not factored in the social, and, especially, the environmental costs. The environment has been greatly impacted by the use of the chemical inputs that the high yield hybrids need because when we apply insecticides we don't kill just the pests but we also kill all predators that would control these pests. We also contaminate water, air and land.

Now, the problem with this kind of indiscriminate killing is that the world environment cannot be seen as containing independent factors. As Western science now must recognize, each factor in the environment is a link in a chain of events or situations. That means that if we destroy or we wipe out a population of insects, we are probably wiping out a population of some plants that use this insect to propagate. That means that in time, we can't tell exactly in how many years, but in time, we'll have a chain reaction in the environmental condition that creates a new problem and we will have to go through again the same process to obtain a hybrid to resist this new condition. This process, of course, is going on and on and the conditions of the environment are rapidly changing, and we can also say, rapidly deteriorating.

Western science may be able to develop, through genetic engineering or some other technique, a variety of different crops to readapt to the new conditions that are being created in the world. Some claim that new varieties will be adapted to acid rain, will adapt to the greenhouse effect, to the increase of carbon dioxide in the atmosphere. But we also have to think that not only the plant varieties have to be adapted, but also that, as humans, we have a genetic structure. So, in time, we also have to be readapted to new conditions because we are already, by natural selection, adapted to the

...in time, we also have to be readapted to new conditions because we are already, by natural selection, adapted to the conditions that are being destroyed now.



Jorge Quintana, IPNC



Grandfather corn, purple and white, white flint corn and Tuscarora.

conditions that are being destroyed now. This means to me that we will have to put ourselves in the hands of the genetic engineers for the adaptation of our own genetic code, to be manipulated by them. This, for me at least, represents a dangerous situation. This is where the Nazis in Germany were heading.

After these general thoughts about the current agricultural situation and the problems that it presents right now or will in the future, I want to talk a little about how corn is involved in one particular agricultural system in Central America, that of the Nahua Indian communities in the Pacific side of Nicaragua. This system is not the same as the one that was in place there 500 years ago. We all know that many Indian communities or Indian tribes have been relocated from their aboriginal territories. Most of them have had to adapt their natural agricultural techniques to new environments. Also, the people that had the knowledge at the time of conquest, the leadership, the elders, were the first people to be murdered or destroyed by the invaders. We know they killed the scientists, they killed the priests, they killed many of the people that had the knowledge. The conquistador's idea was to leave only the average citizen from these nations to work as slaves. And, as slaves, they seldom could

gain new education. But many did keep fragments of information about how to do things, what was passed down as tradition, and they have been applying those ways, those techniques. The people may not know the scientific principles behind their agricultural traditions, but many of them do work and if we never investigate them, we will never find what those principles are.

I want to describe, then, how one of these systems works. I'm not claiming that this is the most adaptable, or adequate system to that specific environment, but surely it worked for countless generations and I believe, given all the now explicable factors, worked better, over the long run, than do the new improved varieties.

On the Pacific coast of Nicaragua, there are two seasons, a dry season and a wet or rainy season. The rainy season starts in May and goes on until October and the dry season starts in November and goes on until April. During the dry season, the land is left in fallow. This means other plants are left there to grow and there is always a vegetable cover on the ground to reduce soil erosion. Then, sometime in April, people will go into the field. They will slash and burn whatever is there, including the remains of the crop from the previous year. Depending on how the land slopes, they will plow or not plow. A few of them will have a tractor, but most

The people may not know the scientific principles behind their agricultural traditions, but many of them do work and if we never investigate them, we will never find what those principles are.

will use an ox. Where a slope is too steep, they will plant in hills. They won't remove the soil. Nevertheless, the planting will have always the same sequence. They will first slash and burn before it rains. Then, after it rains, they will plow the land. They will let the soil be until sometime in May just around the new moon.

They will usually plant corn when the new moon is in the sky. A lot of people that I have talked with about this, in Nicaragua, Guatemala, and even Iroquois people, have this same tradition. However, scientists and technicians will usually discard this as another Indian superstition. But now we know, especially people in entomology, that the phase of the moon may have influence on the stage of development and number of individuals among the insect population. Usually, when you plant an improved variety or hybrid not according to the moon and you don't apply insecticide to the soil to control soil pests, you will have a high damage by insects on your crop. But that usually doesn't happen with Indians when they grow their own varieties and they plant around the new moon.

After the soil is prepared and before planting, the Nahua farmers let their chickens and other birds go into the fields and eat the insects in the soil. That serves two purposes. First, it will reduce the insect population of the soil. Secondly, it will reduce the dependence of the chicken on grain that the farmer feeds them. That leaves the farmers more grain for themselves and that also reduces the potential for damage on the corn seedlings.

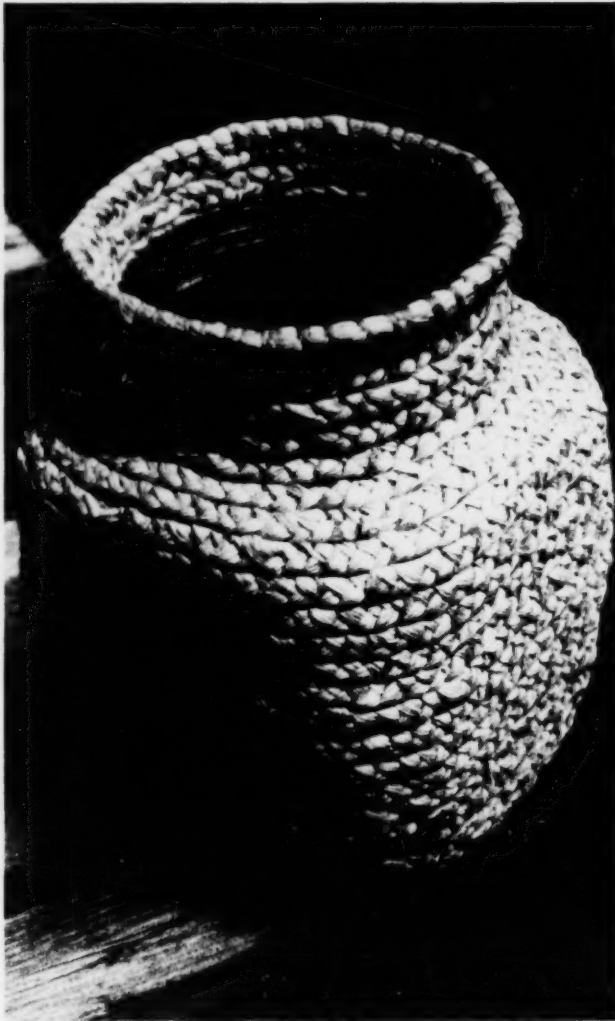
Then, with the new moon they will plant the corn. Some people will have their own ceremonies, some people won't. I'm not trying to talk about the religious aspects involved with it, just about the technical aspects involved. Around the twentieth to the twenty-fifth days, depending on the specific site where they are, the farmers will undertake a control of insects and weeds, but it will be a selective control. They will go into the field and they won't eradicate everything they find there. They don't know the scientific names of the plants, but they know the different species and the different uses and the different benefits that they may have. They will eradicate some of these species totally.

They will leave some other species, especially legumes, and other plants that may be considered weeds but which are also known to be hosts for beneficent predator insects. Another weeding will be done around twenty to twenty-five days later, and that will give enough time for the corn crop to develop. Then they won't do any other cleaning but by then the plant will be big enough to compete with the weed population.

Once the corn has entered the reproductive stage, the farmers will go into the field and plant another crop. They usually plant a vine bean. They will plant it close to the stalk of the corn and the stalk of the corn will be used by the beans to climb and to produce. Then, within rows, where there is usually a wide space of around forty to forty-two inches, they will plant some cassava or squash or even bush beans because, by this time, the foliage of the corn has dried out, or the corn is losing leaves, and they have less competition for light and also water. Even when the corn is still taking some water out of the soil, the requirement of water by this time is not as high as before.

The beans serve two purposes. The first purpose is to add nitrogen to the soil. They have a symbiotic association with *Rizhobium* species that fix nitrogen. Part of this nitrogen will be used by the bean plants and part will remain in the soil in the roots of the beans. That will be a source of nitrogen for the next crop of corn. Beans are important because they are the main protein source for the Indian population of the region. They have two main staple foods—corn and beans.

In September or October, they will harvest the corn ears but they will still leave in the field the stalk where the beans are growing and a little later they will harvest the beans and leave in the field all the crops' remains. Once this is done, after both the corn and beans have been harvested, they will let the cows and pigs go into the field and feed themselves on some of the crops' remains. That is an important source of food for these animals because they have small plots, usually within one to five acres. Five acres indicates a big Indian farmer. The average will be something around two acres. That leaves them little space to have animals. One



Cornhusk jar by Irvin Chrisjohn

head of cattle needs something around two acres to survive. At the same time, the animals help to maintain the soil fertility status by supplying readily decomposable organic wastes. Whatever is not eaten by the animals, let's say the hard stalk of the corn, will be burned next year and will be again incorporated into the soil. That is, in general, the most common system of crop production for the indigenous community in the Pacific coast and also in the central region of Nicaragua.

Finally, I want to refer to some work we are doing here in New York. We are establishing a center for special research on indigenous practice right here in Berkshire, around 13 miles east of Ithaca, where we work with corn seed from Iroquois communities around New York. We are looking at Indian agricultural practices that might still be valid for the conditions in this state. We want to see that they can be retrieved and used to improve the quality of the environment or to maintain the environmental balance (*).

One thing that I always like to emphasize is that each factor in nature is a link in maintaining the whole world's survival. We must learn how to manage and use the various factors and not to destroy them. Usually, the Western concept has been that when any of nature's factors, let's say a forest or a river, is an impediment for development, according to their point of view, they will destroy it. I don't think that is the right approach. I think that the right approach is to find out how we can use these factors in a productive way. The productive way meaning not just obtaining high yields but maintaining and preserving the ecological balance of the whole earth.

Finally, we aren't trying to go back 500 years to where we were when the European arrived. We are bringing that knowledge into the present, along with the developments that have occurred during that 500 years.

(*) Quintana is referring to the work being conducted at the Indigenous Preservation Networking Center (IPNC) located at the Crows Hill Farm, 226 Blackman Hill Road, Berkshire, New York 13736.

The IPNC is a center dedicated to the rescue, study and adaptation of ecologically-sound agricultural practices used by Indian nations in the American Continent. Since 1986, IPNC has been conducting work related to the rescue, preservation and selection of genetical materials (seeds) of indigenous varieties of corn, beans and potatoes used by Iroquois farmers of New York. Field research on cultivation practices for these crops have also been conducted. At the same time, the IPNC has also been involved in indigenous communities development projects in Dominica, Guatemala and Nicaragua. In these countries, research on agricultural practices and medicinal plants has been initiated.

The Iroquois Sustainers

Practices of a Longterm Agriculture in the Northeast

Jane Mt. Pleasant

We've just heard Jorge Quintana talk on Indian practices for growing corn in Central America. I would like to bring that discussion a little bit northward. I would like to talk about the practices that Iroquoian farmers use to grow corn in New York State and what importance and relevance that has for agricultural practices in New York State in the 1980s.

I think if you use the term Indian corn, to most people, to most non-Indian people in New York now, the first thing that they think of is the ornamental or decorative corn that we see around so much at Halloween and Thanksgiving. Few people recognize that much of the success of our current agriculture is owed to the efforts and knowledge of Indian farmers who have been growing corn in New York State for more than 800 years. In reality, all corn that is grown in New York State, in the United States, and in the world is Indian corn. It is important that we acknowledge the efforts and the practices of Indian farmers throughout history in bringing that product to us.

People generally don't realize that there was a very active Indian agriculture in practice in New York State when the first settlers came here. We have fairly detailed records of that from some of the first Europeans that came. Just two quick examples: Jacques Cartier, in his exploration of the Saint Lawrence River in 1535, reported in his journal seeing large fields of corn under cultivation surrounding Iroquoian villages. And Henry Hudson, on his travels up the Hudson River, also gave a similar report in his journals that he saw extensive fields of corn under cultivation. Not only were there fields of corn under cultivation, but in the Indian villages themselves, there were large stores of the grain.

Corn was such an important part of Indian culture in

New York State, that when the Europeans tried to destroy Indian peoples in New York State, they did not attack the Indian villages, they attempted to destroy Indian agriculture. For example, the Frenchman, Marquis de Denonville in 1687, during his campaign to try to destroy the Iroquois Confederacy, reported that he destroyed more than one million bushels of corn. And that gives us some sense of the agriculture, for to produce a million bushels of corn requires a tremendous amount of land. It gives a sense of the extent to which Iroquoian people were practicing agriculture.

That same pattern of looking to destroy Indian agriculture as a means of destroying Indian peoples in New York State, continued into the 1700s. We know that Sullivan, in his foray into Central New York in the late 1700s, reported and boasted that he destroyed more than 60,000 bushels of corn in a single campaign when he came into the village of Genessee. Apparently, Sullivan was quite surprised by what he encountered here. He had apparently expected to find wild savages lurking in the forest in central New York State and what he encountered instead was an advanced village life of people with a settled agriculture. The village of Genessee, which consisted of more than 100 homes, was located on some of the best agricultural land in New York State and the village itself was surrounded by cleared level fertile land that was planted almost exclusively to corn. Agriculture was an important aspect of Iroquoian peoples and it represented the cornerstone, the foundation, of Iroquoian power in New York State at the time the European arrived, and for two to three hundred years afterwards.

While agriculture, and particularly corn culture, was important to the Iroquoian Indians, it also became very very important to the first settlers that came here. Our

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Krsi Cook. Braiding corn at IPNC. 1988.

records for this are not from New York State, but rather from the colonists who came to Plymouth and also Jamestown. The Europeans arrived at Plymouth and Jamestown with the seeds of crops they were familiar with in Europe and they arrived also with a series of agricultural practices that they were using in Europe at that time. The crops that Europeans were growing, the grain crops they used, were primarily wheat, oats and barley. They were accustomed to growing these by using draft animals with a plow and they tilled the land and then they would seed these grain crops by a broadcast sowing. Broadcast sowing simply means that rather than planting their crops in distinct rows or in some type of geometric pattern, they simply scattered the seeds on the surface of the land after it had been plowed.

The Europeans arrived at Plymouth but without draft animals. They did come with their seeds that they had intended to use but they found out very quickly that their seeds and their agricultural practices were simply unsuitable for the conditions they encountered in Plymouth. When they attempted to sow their wheat and their oats and their barley without first plowing the land, they simply broadcast it on untilled land, and they got no yield whatsoever.

So it quickly became apparent to them that if they were going to survive in this new environment, they'd better look at how the Indian peoples were practicing agriculture and learn from them. And what they observed was that the Indians were using a grain crop that they had never seen before: corn. Corn is native to the Western Hemisphere and it's not found in Europe. The Indians were using corn and they were planting it in a way that was completely unfamiliar to the Europeans. They didn't use plows and they didn't broadcast seed. Instead, the Indians were planting corn in distinct rows in geometric patterns without tilling their land.

So the first Europeans observed carefully and it became clear that their success depended on their adoption of these practices of corn culture. The practices the Indians were using to grow corn in Plymouth, or in New York State, at the time that the settlers first came, were based on sound agronomic principles. In fact, we use those same principles as agronomists at Cornell today. When we advise farmers in New York State how to grow corn, we use those same agronomic principles that the Indians were using to grow corn back in the 1500s and 1600s.

The Indians understood clearly the importance of several critical factors for growing good corn. First of all, they understood the importance of establishing a proper plant population. They also understood the importance of weed control and soil management in terms of making sure that the soil physical environment and the soil chemical environment was optimum for

The combination of the hill system and the interplanting provided the Indian farmers with a basic agricultural system that controlled plant population effectively, provided a uniform stand of corn, provided a means of contributing nitrogen to the system, controlled weeds, and also provided more than a single crop. With the corn and beans and squash, they had a varied diet.

good crop growth. And finally, they understood the importance of selecting good seed in order to insure that the crop that they were growing had good germ plasm.

The foundation of Indian agricultural corn systems is what we would call today a hill planting system. This involves planting corn in three to four kernels. A small hole is dug, three to four kernels of corn are placed in that hole and then loosely covered with an inch or two of soil. As the corn germinates and then begins to grow, the small seedling comes up above the ground surface. The Indians would return periodically to weed those young seedlings, removing all of the weeds that were near those young corn plants. As they weeded, they would hill up the soil around those young corn plants. Now the hills were not just randomly or haphazardly put down, but instead they were arranged in fairly uniform rows. The distance between the rows of hills would be approximately three feet and the distance between the hills in each row was also approximately three feet.

In addition to this hill planting system, the Iroquois made great advantage of interplanting. Usually two to three weeks after the corn had been planted, the farmers would return and in the same hills, they would plant two to three bean seeds. The bean seeds, as Jorge mentioned for the Nicaraguan farmers, are able to fix nitrogen, meaning that they take atmospheric nitrogen and turn it into a form that's available to plants. The beans contribute nitrogen to the system that would otherwise not be there. The corn plant, in turn, provides an advantage to the bean in that it offers support so that as the bean plant grows, it grows up around that corn plant. But in addition to the corn and beans, in the area between the rows, many of the Indians would also plant a low growing crop such as pumpkins or squash and that would cover the ground area between the rows and between the hills. The advantage of the pumpkin or squash seems to be primarily weed control because it's a low growing and a close growing crop; it covers the land, the soil, and is able to choke out any emerging

weed seedlings.

The combination of the hill system and the interplanting provided the Indian farmers with a basic agricultural system that controlled plant population effectively, provided a uniform stand of corn, provided a means of contributing nitrogen to the system, controlled weeds, and also provided more than a single crop. With the corn and beans and squash, they had a varied diet.

Indian farmers were also aware of the importance of soil management; in particular, of the role of soil in providing the nutrients that corn plants need to make good growth. The fields they used for their most intensive corn appear to be the rich bottom land soils which we know to be most fertile. Many of these fields were used continuously for several years and they continued to yield quite well despite the fact that Indians did not have access to many organic sources of fertilizer and of course they had no inorganic sources of plant nutrients.

There is some indication that Iroquois farmers in New York State used fish as a source of fertilizer in fields where the inherent fertility was somewhat less or in fields which had been in corn production for several years and yields had begun to decline. There are some records from the colonists in New York State that indicated that the Iroquois farmers did this on a limited scale. We also know from the records of the colonists in Plymouth that the Indians in New England used fish as a source of fertilizer to a fairly large extent, and there is no reason to expect that, or to think, that the Iroquois Indians would not have used that same type of practice.

In addition to careful field selection, looking for those fields with high levels of native fertility, and use of supplementary fertilization with fish, the Iroquois also had a system of land abandonment, or fallowing, as a means of maintaining soil fertility. In this way, they would come into a field that had not been in corn production for some time, and had grown up into trees. They would girdle those trees, allow them to die and

then dry down, and then the field would be burned. The girdling would take place in the early spring and the burning would take place in late summer or early fall. The ashes that resulted from the burning of that plant growth provided the nutrients for corn growth for the corn that would be planted that following spring. The field would then be kept in corn production for several years, depending on the level of soil fertility. When yields began to decline, the people would move onto another field and allow the field they had been using to regrow once again to weeds, bush, and trees. The whole process could be repeated again in ten to twelve years after the system had reestablished itself and soil fertility levels had again climbed up.

The Indians had developed an agricultural system that was stable and agronomically sound. The Iroquoian farmers had their yield levels in line with their natural resource base. Records seem to indicate that Indian farmers were getting yields of corn somewhere in the area of 25-40 bushels per acre. Now, this is a very modest yield level, but considering that they were able to select some of our most agriculturally productive soils in the state and that they used plant residues carefully, then the yield levels they were getting enabled them to practice corn culture or to use continuous cropping of corn on a sustained basis without the need

for large amounts of either organic or inorganic fertilizers.

The hill system was important not only in terms of the weed control and the maintenance of a uniform plant population. In many cases, the Indians used the same hills year after year. In other words, they would return to the same field and the hills they had created in the previous year, and use that same hill to plant their corn once again. When they weeded, and when they returned any crop residues (typically the Indians used primarily the grain, they didn't use the rest of the corn stalk) they would return all of the plant residues, from both weeds and the corn plant, to that hill. They were returning a large amount of organic matter to a restricted area. Rather than scattering crop residues uniformly across their field, they restricted where they put these crop residues—they placed them directly in the hill where they were going to plant their corn crop.

Organic matter is important in terms of the soil environment because it creates a sound physical environment for crops to grow in. It increases or improves the tilth of the soil. It makes it easier for both water and air to move through soil and that means it creates an ideal environment for crop root growth. The Indians recognized that. They recognized that if they wanted to improve organic matter levels in the soil and



*Iroquois men hoeing, Six Nations Reserve, 1986.
Photo by Steve Wall.*

improve physical conditions for crop growth, one of the most effective ways to do that was to return plant organic material in a concentrated area.

Organic matter is important not only in terms of the physical environment that it creates, but also in terms of the chemical environment. In order to grow corn, soil needs a tremendous amount of nutrients. Organic matter contains those nutrients that corn needs and organic matter will release those nutrients to the corn plant. So the maintenance of these hills with high levels of organic matter was important also in terms of the soil chemical conditions that were created. So the cropping system that the Iroquois were using in New York State was a stable and agronomically sound system.

Corn is a highly prized grain throughout the world today. It's one of our major animal feeds and it's one of the food grains that we use for human food. In New York State, its primary importance is as an animal feed. New York's most important agricultural enterprise is dairy farming. Dairy cows eat corn in order to make milk. So corn is a grain that is extremely important to us and it is a gift that comes from Indian farmers.

We know that the wild ancestor of corn most likely originated in Mexico or in Central America and that by the year 2,000 B.C., the corn plant was no longer capable of reproducing itself without human intervention. This was because the direct efforts of Indian farmers over several thousand years had bred and selected a corn plant that had the desirable agronomic characteristics we see in corn plants now. There had been an extensive breeding program in progress for several thousand years, primarily in Mexico and Central America, that had altered the physical structure of the wild relative of the corn.

It is thought that corn was brought north and east from Mexico by the Hopewell people, Indian peoples who were living in southern Ohio. Archeological records indicate that those people, the Hopewell were growing corn between the times of approximately 100 BC and 800 AD. The first agricultural settlements in New York State are dated to approximately 1070 AD. And by the time the Europeans arrived here in the 1500s, the Iroquois at that point were using and maintaining several different varieties of corn. They had flint, flour, sweet, and popcorn—these are types of corn, not corn varieties—and within each one of those types of corns they used and grew several different corn varieties.

Because we know that Indians in the 1500s and 1600s in New York State had several varieties of corn and they maintained these varieties, we know that they had a clear understanding of corn breeding. They understood that in order to maintain separate varieties they needed to do certain things; that if they wanted to keep pure strains of their varieties with separate characteristics,

Because we know that Indians in the 1500s and 1600s in New York State had several varieties of corn and they maintained these varieties, we know that they had a clear understanding of corn breeding.



Jane Mt. Pleasant planting, IPNC.



Squash harvest, Cattaraugus Reservation, 1985.

Photo by Rick Jemison

they needed to keep isolated plantings of those different corn varieties. The reason for this is that if you take two different varieties of corn and plant them side-by-side, the product you get will be a mixture of the characteristics of those two different types of corn. So if you want to maintain the characteristics of a particular type of corn, you need to keep your plantings isolated. But what the Indians also realized is that when you keep isolated plantings of corn and continuously plant the same variety and never allow any kind of cross pollination, the vigor of those plants and the yield gradually declines. So if you want to keep your corn plants vigorous and high-yielding, you need to periodically allow for deliberate crossing of different types of corn. The Indians also were clearly doing that, because their varieties were vigorous and well-yielding.

Finally, in order to maintain good corn stock, you have to understand the importance of good corn seed. You can't just take any seed from your crop and plant that next year. Records from colonists who were in New York State when Iroquois farmers were practicing, indicate that Iroquoian farmers were careful about the seed they used for planting. They always looked for the ears that had the most desirable characteristics: uniform kernels chosen from the center of the ears. Those kernels would then be set aside and used for planting their next year's crop. All of these things indicate that the Indians clearly understood what they were doing; that they had a breeding program and that they understood the basics of corn breeding and what the important aspects were of being able to maintain individual varieties of plants

that would be vigorous and high yielding.

The corn varieties that we use in the 1980s are a direct product of Indian corn that was used by Iroquoian farmers in New York State in the 1500s. Most farmers in the United States now grow a type of corn called dent corn and it is all hybrid corn. And all of these hybrid dent corns are primarily a result of crossing a dent corn that was used by Indians in the southeast United States with some of the northern flint corns that were common to the Iroquois of New York State. In fact, in Cornell's breeding program, the first hybrid that was released was called Cornell 29-3 and that used as one of its crosses, Onondaga White Dent, a dent corn used by Onondaga Indians. So we have a direct link that shows that Indian corns are very much a part of the corns that we are using now. Cornell Hybrid 29-3 is no longer in use in New York State, but Indian corns represent the crosses from which the hybrids have been created.

Just as important as the corn plant itself, in terms of agriculture in the 1980s, is the idea or the concept of what constitutes a cropping system that's stable. There's been a great deal of controversy and a great deal of questioning in the agricultural community in the last several years about whether some of our agricultural practices are indeed stable. Some of the questions are related to the areas that Jorge touched on.

First of all, there's the problem of pesticides. There is a fear that we are contaminating our water by run-off from pesticides and also by leaching of some of the more mobile inorganic fertilizers. In addition to that,

there's a great deal of concern that some of our agricultural practices are leading to serious soil losses by erosion. Much of the corn in this country is planted after plowing and oftentimes the land is left bare, particularly if the corn is planted on any kind of slope at all and it is vulnerable to soil erosion. If we get a heavy rain after the land has been plowed, it can lead to heavy soil losses. Plowing is essentially the destruction of soil structure. It leaves the soil fluffy. Plowing also turns under all plant vegetation that was covering the soil surface and so the soil is extremely vulnerable to losses by erosion.

There's been a great deal of questioning of whether some of our current agricultural practices are indeed sustainable, whether they are stable. The result of this is that in recent years there's been quite a bit of interest at many of our land grant institutions by agronomic scientists beginning to investigate and research ways to make our agricultural systems more resistant to problems of degradation. Cornell, being a land grant institution, is no different. There's a lot of interest on the Cornell campus in looking at agricultural systems that will not cause so many problems in terms of either nitrate leaching or pesticide contamination or losses by soil erosion. It is not surprising, I guess, that as agricultural scientists look for practices that are more sustainable, they learn that some of the practices are directly linked or related to those used by Iroquoian farmers 500 years ago.

There was a great deal of interest in the 1950s and 1960s, both in Cornell and across the United States at different land grant institutions, in a system of planting that we call no-till. Most corn, all corn in fact up until the early 1960s, had been planted after the land was first plowed. No-till systems involve planting corn without first plowing the soil. Rather than overturning the entire field of soil, you use a special planter which simply inverts a small section of the soil and plants the corn seed directly in that small section, leaving the rest of the field intact. In other words, the structure is maintained, and if there is any vegetation on the ground, that is also maintained. The advantage of no-till corn is that it greatly reduces soil losses by erosion.

The Iroquois farmers were using a no-till system 800 years ago. We were quite proud of ourselves in the 1960s. We thought it was something new. It's obviously not new. Indian farmers understood the importance of no-till systems long ago and we are simply reinventing that.

We're also looking at another tillage system. This is one that is much more recent. It's called ridge tillage. This is a system that has been in use in the Midwest for probably 10 years. It's getting a great deal of interest in New York State now. We have an agronomist at Cornell that's working on this ridge tillage system. What this

involves is that, once again, instead of plowing the field, we go through the field with special implements that ridges-up the soil in a particular area, it brings soil from either side into the middle and on that ridge we then plant corn. The importance of this is that those ridges are maintained year after year. And so, the next year when we plant corn again, there's no plowing done at all. The ridge is chopped off at the top when we first plant the corn. The corn seed goes in and then when the corn grows up to be 6 to 8 or 12 inches tall, we go back through and reform those ridges. If you think about it, what is actually happening with those ridges is we are hilling out soil around those corn plants. What we're really looking at is a hill system that's been mechanized. The ridge tillage system creates a much more favorable soil physical environment for the corn plant.

Of course these are the same reasons why Iroquoian farmers were using their hill system and why they maintained those hill systems year after year. We also add organic matter to those ridges. When we travel down the field with our implement that makes the ridges, corn stover from the previous year is thrown into that ridge. It adds organic matter. Once again, it's the same principle that Indian farmers were using 500 years ago. And once again we think, as agronomic scientists at Cornell, that it's something new. It clearly isn't and we need to recognize that, recognize where some of these practices are coming from.

Finally, there's been a great deal of interest at Cornell during the last decade in developing corn systems that involve intercropping. Tom Scott, a soil scientist in the Department of Agronomy, has been working for about ten years trying to develop a corn system which involves interplanting of legumes or grasses between the corn rows. For example, he has been using red clover, a legume, planted between the corn rows. When you do that you get certain advantages. First you reduce the possibility of soil erosion because you don't have bare ground. If you use a legume, such as red clover, you have the potential to contribute fairly substantial amounts of nitrogen to the cropping system that would otherwise not be there. And finally, a close growing crop like red clover or a grass can perform a valuable function in controlling weeds. Once again, these are the same reasons that Iroquoian farmers used interplantings in their corn cropping system.

So in conclusion I would emphasize once more that Indian farmers have been practicing agriculture in New York State for more than 800 years. They used a system of corn cultivation that was based on sound agronomic principles, and those are the same principles that we still use now in 1988 for growing good corn. There's a tremendous amount that we have to learn from those systems, and we need to recognize the contributions that Indian farmers have made to our agricultural systems in the 20th century. •

STORY

O-na-tah

Spirit of the Corn

O-na-tah, Spirit of the Corn, and patroness of the fields, brings the planting season to the earth.

O-na-tah, chaste in her virgin beauty - the sun touches her dusky face with the blush of the morning, and her eyes grow soft as the gleam of the stars that floats on dark streams. Her night-black hair flares to the breeze like the wind-driven cloud that unveils the sun. As she walks the air draped in her maize, its blossoms plume to the sun, and its fringing tassels play with the rustling leaves in whispering promises to the waiting fields. Night follows her dim way with the dews, and Day guides the beams that leap from the sun to her path. And the great Mother (earth) loves O-na-tah who brings to her children, the red men, their life-giving grain.

At one time, O-na-tah had two companions, the spirits of the bean and the squash. In the olden time, when the bean, corn and squash were planted in one hill, these three sister plant spirits, the De-o-ha-ko were never separated. Each was clothed in the plant which she guarded. The Spirit of the Squash was crowned with the flaunting gold trumpet blossoms of its foliage, and the Spirit of the Bean was arrayed in the clinging leaves of its winding vine, its velvety pods swinging to the summer breeze.

One day when O-na-tah had wandered astray in search of the lost dews, Hah-gweh-da-et-gah, capturing her, sent one of his monsters to blight her fields, and the Spirits of the Squash and the Bean fled before the death winds which pursued them.

Hah-gweh-da-et-gah imprisoned O-ne-tah in his darkness under the earth, where she languished, lamenting her lost fields, when a searching sun ray discovered her and guided her back to her lands.

Bewailing the desolation of the blight, and mourning the desertion of her sister spirits of the bean and the squash, O-na-tah made a vow to the Sun that she would never leave her fields again; and now she holds her vigils alone, separated from her sister plants.

If her fields thirst, she can not leave them to summon the dews. When the Flame Spirit of the Sun burns the maize, O-na-tah dare not search the skies for Ga-oh, to implore him to unleash the winds and fan her lands. When great rains fall and blight her fields, the voice of O-na-tah grows faint, and the Sun can not hear; yet, faithful, she watches and guards, never abandoning her fields till the maize is ripe.

When O-na-tah brings the planting season, her crow flocks know, and the birds whirl and call in the sky. When invoking the aid of the sun, O-na-tah scatters her first corn over her broad land, the birds flutter down and hunt the foes that follow the roots in the earth.

When the maize stalks bend low, O-na-tah is folding the husks to the pearly grains that the dew will nourish in their screening shade as they fringe to the sun. When the tassels plume, O-na-tah is crowning the maize with her triumph sign and the rustling leaves spear to the harvest breeze.

The custom of "blessing the fields" is still continued among some of the Iroquois. When the leaf of the dogwood is "the size of a squirrel's ear," the planting season has come. Before the dawn of the first day of the planting, a virgin girl is sent to the fields, where she scatters a few grains of corn to the earth as she invokes the assistance of the Spirit of the Corn for the harvest.



Ed. Note: Story reprinted from Harriet Maxwell Converse, Myths and Legends of the New York State Iroquois Arthur Caswell Parker, ed. Albany: New York State Museum, 1908.

Three Sisters—A Iroquoian Cultural Complex

Stephen Lewandowski

The day was bright when I went into the planted field and alone I wandered in the planted field and it was the time of the second hoeing. Suddenly a damsel appeared and threw her arms around my neck saying, "When you leave this earth for the new world above, it is our wish to follow you." I looked for the damsel and saw only the long leaves of corn twining around my shoulders. And then I understood that it was the spirit of corn who had spoken, she the sustainer of life. So I replied, "O spirit of corn, follow me not but abide still upon the earth and be strong and faithful to your purpose. Ever endure and do not fail the children of women. It is not time for you to follow for Gai'wio (the Good Message) is only in its beginning."

—the Code of Handsome Lake¹

The visions which Handsome Lake, the Seneca prophet, received in 1800 often reflect a profound cultural conservatism. His message reiterates ancient attitudes and values and consolidates their position in the ravaged, post-contact Seneca society.

Handsome Lake's vision of the corn maiden involves the expression, through Handsome Lake, of the ancient association among corn, beans, squash, and humans and the necessity for this relationship to abide and endure.

We can say that the veneration of the Three Sisters appears in the earliest accounts of white explorers and missionaries on the continent. From its earliest appearance in written records, it was not simply an



Pounding corn, Tonawanda Reservation, 1986.

Photo by Steve Wall

agricultural strategy of technology but a cultural complex, full blown, complete with stories, ceremonies, technology, customs, and etiquette. All indications lead one to believe that the Three Sisters complex is ancient, though not necessarily in the Finger Lakes area. We must at least entertain the possibility that the Three Sisters complex could have been imported whole and added on to the local belief systems along with the addition of hoe and hill culture of corn, beans, and squash to local patterns of hunting and gathering.

The Three Sisters crop complex was found operating at the climactic limit, still recognized, of agricultural endeavor, the one hundred frost-free day line. Among the Huron as among the Seneca, it involved cropping the three plants together in the same fields, with "pure" stands of corn and beans at other locations, with the majority of labor coming from women using digging stick hoes, and with most of the labor carried out in communal form. Three Sisters land use implied the rotation of fields rather than crops. Not only the large available land base but the more intensive use of the cropped land made this strategy possible.

The rotation of fields, with extensive fallow periods, and the movement of whole villages allows the fallow land to fit nicely into the older hunting/gathering pattern. First of all, the fallow land will serve as genetic reservoir of the re-sprouting cultivated plants, an area in which they would encounter "wild" conditions and relatives and perhaps develop unforeseen but valuable new characteristics. Corn, in the process of domestication, may very well have occurred in such a disturbed, "waste" spot.² Second, the fallow fields would be considerably more attractive to certain species of wild animals. Given some species' attraction to "edge," it is logical to presume that yields of hunted creatures could have been maximized at such spots. Also, clearings filled with resprouting trees would have afforded the large numbers of poles needed for houses and palisades.

Land clearing was one of the practices of Three Sisters agriculture which was defined as men's work. It was carried out by groups of men working with controlled fire and stone axes to girdle trees. The dead trees were generally left standing and slowly dismantled for firewood and bean poles. The yearly preparation of the fields began immediately after sugaring, in late March. By late April or early May, the burning of crop residues and weeds and the early hoeing would have been complete.³

Labor in the fields was almost always communal. Mary Jemison, who spent many years among the Seneca beginning in 1755, spoke of the work as "leisurely." The matron would choose several lieutenants, whose job it was to coordinate the work and workers. Often groups of forty to fifty women would meet at a set time to work together in the fields. They arranged seed bed

preparation, planting, hoeing, and harvest as "bees." Children were expected to assist in these tasks as well as to guard plants from pests such as crows and raccoons after emergence. While hoeing weeds together, the women would carry bundles of short sticks, each with a personal sign and brightly decorated. These sticks were used to mark their work place and to call attention to their work. At a typical husking bee, which took place at night in the fields, the women would work on the ears piled in husks and older men would tell stories for their amusement. Huskers smoked tobacco, sumac leaves and red willow bark (*Cornus stolonifera*) wrapped in corn husks while they worked.⁴ Husking time was one of the rare occasions when men might be requested to help with agricultural work. A body of lore about oddly shaped and colored ears found during husking grew up.⁵

An important addition to the agricultural work force was the "slave." The exact terms of this slavery are uncertain, but it is clear that war captives in the pre-adoptive stages, men and women alike, were put to work in the fields. The products of these fields were traded or gifted to nearby villages. Wallace states that the adoption of such people "stood half-way between kinship and political action..."⁶ Newcomers lost their political independence and were settled on peripheral territories of the established tribes. Given the equal and sometimes superior status of women in the matrilineal and matrilineal Seneca, some researchers have concluded that "traditional Iroquois culture evolved so that females (caretakers of gardens, collectors of wild foods) and an awareness of female ancestry (the mechanism by which past, present and future access to property was determined) became dominant concerns."⁷ Certainly the cycle of ceremonial observances which were agricultural, not based in hunting or warfare, argues for a feminine dominance. Even the Seneca language, in which a feminine pronominal prefix is used for plants and animals in general, reflects this association of women and nature.⁸ Hence the prohibition against menstruating and pregnant women taking part in planting and food preparation is designed to segregate women from their traditional tasks not as a reflection of the status of women but as a matter of protecting the health of sustaining cycles.

As a part of their strategy of communal land use and labor, the planting, in which timing is always a crucial factor, was handled on a rotating basis. The crew of women would plant some hills in one field, continue on to another field and plant some hills, go to a third field and plant some, and so on until every field had some hills planted; then they would return to the first field and continue the round of planting, so that they would avoid the complaint of favoritism. Of course, staggered planting would lead to staggered harvest which, from

their point-of-view, would be preferable.

Planting began when, depending on the source you believe, the leaf of the oak or dogwood was the size of a squirrel's foot or ear. Often blossoms of the sassafras (*sassafras albidum*) were buried in the hills during planting. Planters used specially constructed bark and twined fiber apron containers for holding the various seed handily. Seeds were often soaked in either water or other "medicine" prior to planting. Handsome Lake speaks approvingly of this practice and mentions *Phragmites communis* and *Hystrix patula* as specifics. Some of these were thought to stimulate growth; others such as Hellebore (*Veratum album*) were repellent to birds and other pests. Soaking corn and other seeds to soften seed coats would be somewhat more important when they were being planted in the elevated, drier hills. Arthur Parker emphasizes the Seneca interest in the number seven; he states that seven corn kernels were planted per hill and that squash and beans were planted in every seventh hill. Other accounts differ, speaking of four to six kernels per hill and a ring-planting pattern of beans and squash. The hills were more-or-less permanent features of the fields (some can be seen to this day) about one foot high, two feet in diameter, and "a pace apart."⁹

Corn yield of Three Sisters fields has been estimated at twenty-five to thirty bushels per acre.¹⁰ One account estimates that fields planted to the Three Sisters by the Hurons contained two thousand, five hundred hills¹¹ but that figure seems high when checked by actual plantings.

Some fields were ridged rather than hilled and corn was planted into the ridges. Father Hennepin, in 1675, speaks of the Iroquois as practicing fertilization of their fields: "(They) manure a great deal of Ground for sowing their Indian corn in, of which they reap ordinarily in one Harvest as much as serves 'em for two years."¹² The women hoed the crops at least twice, the first time in early to mid June when the corn reached a span (nine inches) high and the second time in early July when it reached knee-high. The second hoeing, called hilling-up, must have taken place before the squash and beans began to climb and run. The hoeing was performed with stone hoes, disciform in shape, with chipped or ground side notches, or with palmate sections of elk antler. Some of the most prized trade items during early contact years were metal hoes. Though their technology differed, early white settlers followed many of these customs and patterns of agriculture exactly.

The harvest of the Three Sisters was stored in several ways. Three foot wide braids of corn ears held by four husks were strung through the longhouse rafters. Seed corn for the coming year was left on the cob until just before planting. Shelves above and below

In the Three Sisters we find an agricultural complex closely attuned to the cultural and natural factors of its existence.



Washing corn, Onondaga Reservation, 1986.
Photo by Steve Wall.

*For the Seneca, crops were the
clocks that traced their course
through the year*

the sleeping bunks were often used to hold elm bark containers of dried foods (parched corn, shelled beans, and sun- or fire-dried squash). In some instances special buildings have been discovered which are thought to have been constructed as granaries. Probably the most common storage technique was the underground pit. Pits ranged from three to six and a half feet deep and from three to four feet in diameter. Some were bell-shaped. They could contain seven to ten bushels. Sand and gravel for drainage was used to line the bottom of the pit. The pits often had a bluestem grass and/or hemlock bark lining. After filling, a hemlock bark cover was placed over the pit and covered with soil. Within the pits, a low oxygen atmosphere would develop that would retard further spoilage or sprouting. The Seneca generally maintained a surplus of foodstuffs for emergency or trade.¹³

Beans and squash require little special preparation, except for re-hydration, before being eaten. Whether fresh or dried, they were simply added to bread or stew. Corn, however, generally requires some processing before use. It was mulled between flat stones, over a bowl or basket to receive the meal. Other times it was ground with a cylindrical stone pestle in a hollowed wooden mortar. Often the mortar was made of black oak and had an eight to twelve inch hollow. One sugar maple pestle was forty eight inches long and fashioned so that either end could be used for grinding. Tight baskets for sifting meal and looser ones for corn hulling and rinsing were common household implements. The most common preparation of corn prior to use was the making of hominy. Kernels were soaked in water made alkaline with wood ashes until their husks loosened. The husks were rinsed away and the remaining kernels were either used whole or were dried for later whole use or to be ground into meal.

Iroquoian cookery included many variations on stews. Food was generally boiled, either in pottery suspended over the fire or in bark or pottery containers whose liquids were heated by the addition of hot rocks. Baking and roasting, particularly of meats, was common. Utensils were few; there were some privately owned spoons but most spoons were simply used by the household for portioning out food, which was then eaten out of bowls with the hands. Bowls were either carved wood or bent bark. Common dishes were succotash, the most primary combination of the Three Sisters, cornbread with fruit or beans, hominy soups, and stews with meat and squash. Maple syrup and berries were added as sweeteners to a variety of dishes. The use of small amounts of corn meal, perhaps a handful mixed with sugar and dried fruit, as a travel food was legendary. Runners would pause to prepare a gruel of the meal and water before running on. At home, tradition called for only one more-or-less

regularly scheduled meal per day, a late breakfast. Otherwise, there were no set meal times, though bread and stew were commonly available. Iroquoian hospitality and generosity required that food be kept readily available at all times for chance guests. No business could be considered until food had been offered and ceremoniously eaten. Along with axes and hoes, one of the most desirable early trade items was the brass or iron kettle. Though the first kettles were cut up to make ornaments, metal kettles nearly eliminated pottery ones within fifty years after contact.¹⁴

Mary Jemison, with experience in both native and colonial agricultures, occupied a unique position to reflect on them. Years removed from her experience, she spoke fondly of Seneca farming life which she remembered from the 1760s.

"Our labor was not severe; and that of one year was exactly similar, in almost every respect, to that of the others, without that endless variety that is to be observed in common labor of the white people. Notwithstanding the Indian women have all the fuel and bread to procure, and the cooking to perform, their task is probably not harder than that of white women, who have those articles provided for them; and their cares certainly are not half as numerous, nor as great. In the summer season, we planted, tended and harvested our corn, and generally had all the children with us; but had no master to oversee or drive us, so that we could work as leisurely as we pleased. We had no ploughs on the Ohio; but performed the whole process of planting and hoeing with a small tool that resembles, in some respects, a hoe with a very short handle.

"Our cooking consisted in pounding corn into samp or hommany, making now and then a cake and baking it in the ashes, and in boiling or roasting our venison. As our cooking and eating utensils consisted of a hommany block and pestle, a knife or two, and a few vessels of bark or wood, it required but little to keep them in order for use."¹⁵

In the Three Sisters we find an agricultural complex closely attuned to the cultural and natural factors of its existence. Barring disruption from the outside, the Three Sisters culture could have had a long life. In fact, the Three Sisters complex appears to have had a sustainability and permanence which modern, industrial agriculture lacks.

The degree to which the whole world revolved as one with the agricultural cycle can be seen in Mary Jemison's story. At one point she mentions that she bore a child "at the time that the kernels of corn first appeared on the cob." Her child died, and Mary was taken so gravely ill that many thought she would die, but her "complaint took a favorable turn, and by the time that the corn was ripe (she) was able to get about."

For the Seneca, crops were the clocks that traced their course through the year. Mary Jemison marked birth and death by the crops. The Three Sisters cultural complex consisted not only of agricultural and nutritional strategies but of a body of stories, lore, ceremonies, and customs that touched every facet of their lives. The Three Sisters complex was not "progressive" or expansive in most senses; it was conservative and enduring. It seems to have returned good, steady yields to "leisurely" labor and to have been sufficient to support a culture that used land without spoiling it. •

NOTES

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Relocation and Cultural Persistence

Hopi and Mohave in the 1940s

Milton Barnett

Just prior to the symposium, "Seeds of the Past" at the Smithsonian Institution and "Corn—Indian Gift to the World" at Cornell saw the end of an exhibit and conference which dealt with the relocation of Japanese-Americans in the first months after the entry of the United States in World War II. Had not this forced evacuation from the west coast to sites in Montana, Colorado, and Arizona taken place, it is possible that the events discussed here might not have occurred. There was a convergence of two separate processes, each involving the movement of minority groups with different histories and each movement coming eventually to an abrupt end.

Had not the War Relocation Authority built houses and roads, extended a canal enabling irrigation of desert, and erected structures for communities to be known as Poston I, II, and III for the evacuees, a heretofore non-utilized blueprint of John Collier's administration as Commissioner of Indian Affairs would not have been taken off the shelf for implementation on the Colorado River Indian Reservation adjacent to Parker, Arizona. By the end of World War II, Japanese-Americans in the several camps in the Western states were "free" to attempt to re-establish their disrupted lives. Only a few remained in Poston when on September 1, 1945, seventy-eight Hopis comprising fifteen families arrived in Parker on their way to temporary housing in Poston I.

Three years later it was considered desirable to take stock of the situation. Now there were 26 Navajo and Hopi families occupying land assignments in the tract set aside by the Tribal Council at the behest of the government for purposes of resettlement. It was anticipated that as many as 15,000 individuals might be moved into the area. A graduate student at Cornell at the time and deeply involved in Chinese studies, I was asked to go to Parker to make an evaluation of the program.

John Provinse, the Acting Commissioner of Indian Affairs, proposed the study and wrote, "We are primarily interested in the sociological and psychological adaptation of these colonists for the conditions existing in the Project. In other words, we wish especially to know the attitude and behavior of the colonists with respect to the satisfactoriness of the resettlement program and the stability of the settlers."

Later comment came from Morris Burge, an official at District 4 headquarters in Phoenix. "With respect to these first colonists, the adjustment they have made in their new environment, the difficulties they have encountered and the manner in which they've solved new problems are... of significance."

Provinse was an anthropologist who first studied law and then carried out significant field research among the Dyaks in Borneo. He turned to policy-making after considerable work in the area of land tenure studies for the Bureau of Indian Affairs and the Soil Reclamation Bureau. Now, on reflection, I find it striking that he initiated the study without consulting the Mohave or Hopi leadership. For better or worse, the study was superimposed upon hosts and guests—a practice that was not uncommon in that period. (In fairness to Provinse, a gentle and considerate person, it must be added that in later years he was highly sensitive about the need for developing participatory studies on a co-equal basis.) In any event, what I say here will be a partial reconstruction of what transpired before I came to Parker, of what I saw in 1948, and what transpired after I left, to return periodically with colleagues from my academic base at the University of Wisconsin.

Why was I selected from a fairly large group of graduate students, some of whom specialized in American Indian studies? I was told by Lauriston Sharp, perhaps with tongue-in-cheek, that since I knew "little" about Indians and hence was not emotionally involved with their problems, I would go with a *tabula rasa*, a clean slate; I would be unbiased in a possibly volatile situation. To be sure I had read the work of Fewkes, Cushing and Laura Thompson on the Hopi and the idea of being with them was exciting. Alexander H. Leighton, another Cornell Anthropologist, had introduced us to his work on the Navajo as well as that of his wife, Dorothea Leighton. There were other classic works one needed to be conversant with—at least for examination. But I was not in any sense an American Indianist and am not today, despite more recent relationships with North Central woodland nations. It quickly became apparent in the field that any notion of "no biases" was quickly dispelled.

John Collier, (U.S. Commissioner of Indian Affairs, 1933 to 1945), was a strong advocate of American Indian

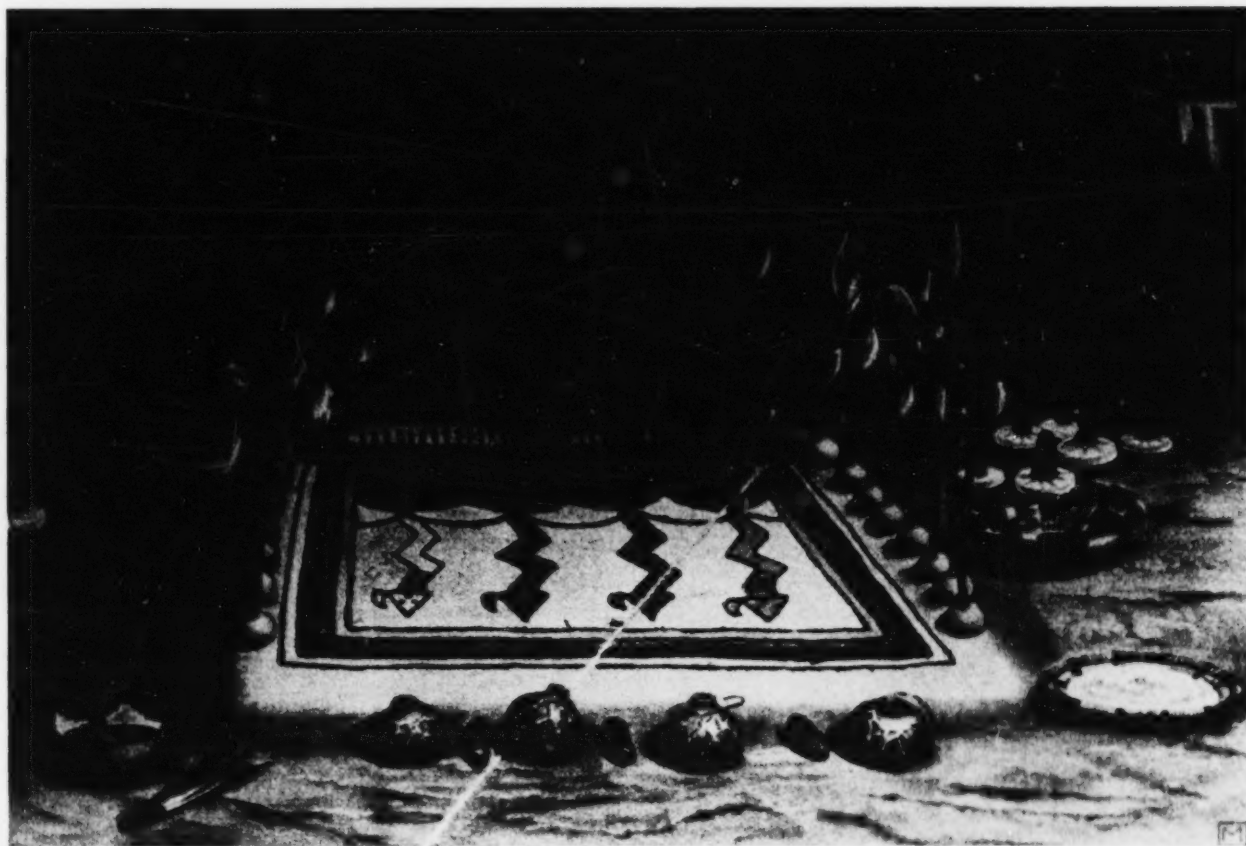
rights as he perceived them. He believed in democracy at the grassroots level, he held that local communities had to organize themselves to make their own decisions and carry those out, and he felt that the structure of the Bureau of Indian Affairs did not and had not permitted such developments. On the contrary, Collier felt that federal policies had disrupted local organization. Through his personal contacts and identification with cultures in the Southwest of the United States, he saw in traditional Indian institutions a series of procedures wherein Indian groups had governed themselves and realized significant values and gains. Collier had several basic goals. One was to help communities organize themselves into tribal governments with a compromise between modern and traditional structures, to bring economic life into the reservations and strengthen them by increasing the land and capital base at their disposal. At the same time, he sought to stop land alienation and allotment of Indian lands to non-Indians. In 1934, American Indians saw passage of the Wheeler-Howard Act with some modification by Congress. Later known as the Indian Reorganization Act (IRA), it has the most impact on western tribes but it also has some meaning here in the Northeast.

It is not my intention to discuss the weaknesses and

strengths of the IRA, and there are many, but the consequences in Parker, the center of the Colorado River Agency, a composite of BIA controls for all Indian lands south of the Nevada border, incorporating Yuma and Fort Mohave on the Mexican border, near Needles, California.

The IRA on one hand encouraged decision making; on the other, the responsibility given to tribal councils was often much too great. Every council, with its handful of tribal leaders, had to become overnight experts with responsibilities thrust upon them; they had to make decisions on every conceivable aspect of social and economic life. They had very little preparation for self government under the IRA. Some tribes were not set up that way (I'll use the term "tribes" rather than "nations," as it has more meaning in a 1930s and 40s context) and yet now found themselves immediately needing to make extremely complex decisions, with the lack of preparation resulting in lawsuits, claims and unexpected bills.

In 1948, Indians on reservations were given the right to vote if they abided by the state regulations on voting. I was present at meetings of Hopis, Mohaves, Navajos and Chemehuevis to discuss the new right with the acting superintendent. At the meeting with the colonists



Antelope Altar at Mishongnovi (note centrality of corn).

Each household would be assigned 40 acres of irrigated land, separated from those of the Mohave and Chemehuevi. (The boundary of demarcation was later to be called the Maginot Line!)

he congratulated them: "You are now Americans at last. You are citizens and you can vote. Make up your minds now—Democrat or Republican?" A Hopi asked, "What is Democrat or Republican?" The superintendent said it was a good question. He said: "Republicans believe in high tariff and Democrats in low tariff—right, Barnett?" "Right."

Self-rule was now a responsibility and there were inconsistencies. The councils were encouraged to make their own decisions but in fact all decisions were reviewed by the BIA ultimately to be approved by the Secretary of Interior with the result that the process became a charade, with feelings of inadequacy and uncertainty, especially with the possibility of denial of decisions as valid. The councils felt a lack of authority, which hadn't been felt in the traditional chieftainship, with its clearly defined and understood rights, privileges, and processes.

The background of uncertainty and contradiction is important in understanding the events on Colorado River. First let us consider the reservation itself. It had been established in 1865 with about 75,000 acres around Parker, Arizona, 165 miles southwest of Phoenix, on the Colorado River, about 60 miles south of Needles. Fort Mohave, at Needles, is a lesser center. At Parker, also an aboriginal residence, are the Mohave, the Chemehuevi, Southern Paiutes who were displaced by the building of dams. The geographical region is desert, yet because of the building of the Parker Dam in 1913, water rights were established and indeed are in dispute today. A railroad and a road went through Parker from Phoenix. There were potentially productive soils and the water available from the Colorado River made them suitable for irrigation. Parker, people said, was "four feet lower than Death Valley." There are mineral resources, never tapped but which used to attract non-Indian gold prospectors and wild horse wranglers. More recently, interest has been raised about possible coal, uranium and natural gas possibilities, undoubtedly triggered by developments on the Navajo reservation.

Parker in 1942 was an isolated place, and it was on the reservation here that the government decided to relocate Japanese-American citizens. There were no chain fences; there was the desert itself, with little possibility of escape. No one tried. (One elderly man did disappear; it was surmised that he got lost in the desert).

Permission to temporarily settle Japanese-Americans on the reservation was requested by a Bureau representative from Washington. The council was ambivalent. It was pointed out to them that there would be buildings, roads, other structures and at the end of the war these would be turned over to the tribe—a promise yet unkept in 1948. Resolution of the request was clearly uncertain until it was suggested that either the council support the request or the army would come

in anyway. The Council yielded, but the vote was by no means unanimous.

The ambivalence and resentment in the Council stemming from this incident in early 1942, one involving felt coercion and unkept promises, persisted and were aggravated when the question of Indian resettlement was introduced. It was argued that in the interest of all American Indians, the Council should open the Japanese camps south of their settlements to the Hopi and Navajo, Papago, Pima, Walapai, Zuni, Apache—to all those landless peoples who live along the Colorado River and tributaries. They should give homes because of the unused land, good desert and plentiful water. There would be a pan-Indian center. Development of the three camps facilitated such a program. There were no Mohave or Chemehuevi land allotments so no conflict need arise.

Willard Beatty, head of the education office at the Bureau, had strong convictions about the need for pan-Indianism as well as support for the cultural integrity that Collier argued for. When I talked with him later, he spoke of a center where the various Tewa, Hopi, Zuni would have their pueblos just like that at Taos, three stories high, built with adobe and very charming. This was his vision and one the Mohave were not entirely sure of. (By "Mohave" I include the Chemehuevi to make things easy.) He was joined by Karney Miller, who was not only chairman of the tribal council but also a strong believer in the importance of pan-Indianism. Miller argued that agreement would help the landless and thus would be to the benefit of all Indian brothers. The vote was again not unanimous, but nevertheless in favor of the proposal.

Once the decision was made to permit resettlement from other reservations, preparations were begun at the Parker Agency. Settlers would be housed in Poston I, the oldest "Japanese" camp, just south of the main concentration of reservation population and farmed land. The government's Mountain School would absorb the incoming children, of whom between 30 and 40 were expected in the first group. There was no felt need to bring in more teachers nor those who had experience with Hopi children.

Each household would be assigned 40 acres of irrigated land, separated from those of the Mohave and Chemehuevi. (The boundary of demarcation was later to be called the Maginot Line!) A credit officer was added to the Agency staff and an extension officer was reassigned with a field assistant to prepare for the arrival of the settlers. Decisions were made about financial credit at low interest rates and surplus tractors and farm equipment which would be made available at low cost, etc. As these plans came to fruition, Mohave and Chemehuevi watched with considerable interest, noting the benefits received by the settlers but not given to themselves.

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The regional administrative center in Phoenix initiated a feasibility study, interesting and not overly productive. The state director of Indian education was distressed because now they might move some of his book supplies to Parker. He pointed out to me that his stocks were kept in round numbers and this would upset his bookkeeping. He particularly referred to Laura Thompson's *Hopi Way* which should have been used by the school teachers to better understand the Hopi students. He didn't care for the book at all. I frequently found a clerical mentality among other staff members of the Bureau. Major question raised about the settlers were such as: "Since we will be lending them money, how good is their credit?" and "How reliable will they be?" This proved to be a major criterion for the selection of settlers.

Credit worthiness came up especially in Hopi country where a survey of family properties of potential settlers was made. The superintendent, Burt Ladd, considered a friend of the Hopi, made the initial suggestions about potential settlers. During a visit to the Hopi reservation, it became clear that Ladd knew all of those proposed. Nearly all seemed to be marginal people: those who had moved away from the core of traditional Hopi beliefs and practices; converts to Christianity (Baptists, Presbyterians, two Seventh Day Adventists) and a Hopi who married a Navajo woman. No study has been made of Navajo-Hopi intermarriage to my knowledge, but I suspect that the number of such marriages, even in the 1940s, was much greater than is commonly imagined or realized. Ladd seemed to move in this direction. At the same time, he seemed to nominate those who spoke English and had therefore had greater contact with him. Ladd was a warm, charming person, completely supportive of the program. He told me later he was in a sense relieved to get rid some of these people because, as active converts, they were a thorn in the side of the majority population. There were, then, lingering doubts about the nature of the settlers and the pattern of selection.

Potential settlers were brought down to Parker to see what they could see. They met with Mohave and Chemehuevi leaders. They later talked about water, the

main asset, and land. They talked with the Mohave, who were nice to them. They were shown the adobe houses and buildings where the Japanese lived, the barracks, the flush toilets that the Japanese had enjoyed. They were told they could move these to their own houses later after they built them. They also tried the flush toilets and the water ran and that was even more exciting. If you know Hopi, this is extremely important. Precious running water so wasted means plentifulness. So they looked it over and came back to their mesas and reported and the families decided to migrate.

After a long trip in open trucks, the Hopis arrived in Parker, exhausted and hot. They had slept out the night before, endured the several hundred mile bumpy trip from the mountains down to this hot area, stopped in Parker and charged into the drugstore, drinking quantities of soda pop and buying all the candy bars that were available. They went on to the school where the Mohave had prepared a picnic for them and no one could eat, being full and sick from eating and drinking too much, let alone from the trip itself. There are descriptions of the vomiting that took place, usually discreetly at the edge of the schoolyard. The Mohave noticed this, being observant people, and felt their guests were not overly enthusiastic about local food and were perhaps rather picky. The picnic came back again and again from various Mohave women and men remembering the incident of September 1st.

Now the people were put in barracks, at first those constructed of wood, not adobe. These were located in a desert spot with fertile areas, the irrigated areas, south of the Mohave and Chemehuevi. There was a bus that accommodated them twice a week, taking them into town, something no Mohave ever had. Only the part of the reservation north of Parker Dam had ever been seen as important and that only as a potential attraction for tourists from Los Angeles.

With resettlement, there was a meeting of four native cultures: Mohave, Chemehuevi, Navajo, Hopi and a fifth culture, the BIA, which has its own folkways, norms, values and rituals and modes of deculturation as well. Where there had been a minimum of social

organization—interaction between residents and staff—partly because of neglect and partly because of the dispersed households of the Mohave, now something else was happening: trucks moving in, machines moving in, etc. So we should take stock for the moment, at least, of the local people, the hosts who made resettlement possible..

Mohave have an active use of their language, even today; even most bilinguals used it in the home and did, to the best of my knowledge, as of three years ago. Most of the older monolingual people have passed away and there has been some attrition, but Mohave is still used.

There is some contradiction between the role of the tribal council, the IRA and the traditional leadership of the chieftains and their roles. Only one man who inherited his chieftainship ever ran for tribal office. Most hold with the argument of, "I don't have to, I inherited the role, so why should I face elections? It's an insult to the chieftainship." There is a shared antipathy to the BIA. The reservation had been set up as a result of a peace treaty after warfare between the U.S. Army and the Mohave, one of the most warlike of the Yuman-speaking tribes. The Mohave had settled down and agreed to maintain peace and did so, if reluctantly, with the dominant white population that rarely came, except occasionally in the form of a superintendent or a clerk for the BIA itself. So there is a history of at least covert hostility to whites, to the BIA or government, and a general withdrawal from Parker and its residents, even though the town is on Indian land.

The Chemehuevi, like the Mohave, are patrilineal; they make a greater use of English and are primarily ranchers rather than farmers. They have moved south to the Parker site as a result of their lands being inundated by the building of the dam. With the Mohave they are active in the tribal council. In both cases, land ownership takes place through heirship or allotment. Farmers grow flax in the irrigated areas, cotton, alfalfa and, more importantly, lease tribal lands to corporations from California to grow melons and other crops for sale elsewhere. Few from the local population are employed in these vast enterprises of tens of thousands of acres of irrigated land.

The Hopi, on the other hand, are matrilineal. They reckon kinship on the side of mothers, and property is in the hands of the women. When a husband and wife fight, the husband goes back to his mother's house, not the other way, because his wife controls the house. This is a different orientation, not familiar to residents of New York State perhaps, but certainly known to the Iroquois. Among the Hopi, women play the dominant role; it is they who control the seed considered precious because the women have selected them for the following year. Hopi culture is replete with ritual, with an elaborate kinship system unlike the Mohave, which is bilateral in a sense. The home village is always

considered home no matter where you live.

Despite the pueblo orientation back home, when the settlers came to Parker and were given a choice of where they would want to have homes—in a concentrated village or a homestead—there was a completely even split. This division in preference is another indication of being "marginal" from the norms of Hopi culture. Why is it that in 1948-9 or later in 1958, Hopis had only built two houses, even though they had amassed piles of cinderblock at the urging of the BIA engineer? They had made the cinderblocks collectively, stacked them and nobody had used them, even a decade later. The materials were there, even those flush toilets to be taken out of the old barracks and moved over; something they didn't have, for the most part, back home. Why didn't they take advantage of this availability of housing materials? For me, the failure to build homes by a people noted for house construction could only mean uncertainty about staying on the Colorado River Reservation.

What had happened? The Hopi had migrated and had been given temporary housing. Each household had been assigned 40 acres of irrigated land. Each household came to a situation where alfalfa was already growing; all they had to do was to learn to drive a tractor and to learn to cut and bale the hay and they would immediately have a crop to sell. There were buyers from Los Angeles willing to pay \$27 a ton, in those days no mean price. And with the promise of five to seven cuttings in a growing year because of irrigation—that was a lot of hay. For the Hopis who came to Parker, this was exciting. The Mohave asked, "Why were we not given a stand of alfalfa?"

So already from the onset there was a differentiation between local residents and settlers. The BIA wanted to see the project work. There was a concentration of personnel and funds to the disadvantage of the existing host population, a fact the observer could not readily dismiss.

There was another factor. It was understood that Hopi and other settlers, after a year or so, and having manifested their capacity to farm adequately, would apply for entry on the reservation rolls. They would become full-fledged Colorado River Indian citizens, but by so doing they would have to surrender all land rights back home. This was no easy task and it was a critical move. After three years, no one had applied for membership, with its attendant ownership of 40 acres.

No clarity had actually been established by the BIA with regard to rights and obligations of the settlers. Neither staff nor tribal council had established criteria for how to determine who was a successful settler or, for that matter, who would make that determination. This uncertainty later perplexed and plagued the settlers.

The settlers had begun with alfalfa because it was already in the fields when they arrived. There was some

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consideration about whether they should grow flax or cotton, but they were advised not to. Both cotton and flax remove nutrients from the soil and since the fields were still desert, the new farmers were advised to let the nutrients, the nitrogen-fixing possibilities of the alfalfa, strengthen their holdings. With every movement toward cash crops there was a concomitant movement away from the growing of traditional crops.

When the Hopi came in 1945, they were able to reap the harvest, the gardens of the last Japanese settlers. They had tomatoes, chilis, corn, vegetables of all kinds, lots of green vegetables, cucumbers, squash, pumpkins... more varied than Hopi or Mohave utilize in their traditional diet. They reaped the harvest, saw the possibilities of the garden and they, the famous Hopi dry-land gardeners, could appreciate what they got. But three years later the Japanese gardens were overrun and I found nothing grown in the plots. Why? The explanation was, "Now we can go to Parker and go to the store and buy our tomatoes, our chilis, our white bread, etc..." Even corn for tortillas was disappearing from the venue of agriculture with the insistence, in part because of the Bureau, on alfalfa and grain sorghum and so on.

Where had the Hopi come from? They had come from an area where annual precipitation was 10-13 inches and no more than that; an arid situation where a crop failure occurs every three or four years because of lack of water and in some years no rain at all. Lack of water is today a source of the tension between the Hopi and Navajo seen in the recent land claims and disputes that went through the courts. Such a situation of aridness and environmental pressure permits us to understand why so much of Hopi ceremonial and traditional behavior is directed toward bringing rain, let alone the implications of rain for successful crops.

There's an unreliable water supply and a short growing season. The May-June planting season can always be circumvented later by drought and the harvest in September may be cut off because of that drought. Watch the Hopi back home at First or Second Mesa and elsewhere as the women carry jugs to distribute to individual plants when the water is in short supply. Planting dates are extremely important as a result of the lack of rain and indeed in one village alone there are nine different planting dates to be determined by the sun watcher who decides which rains may or may not come. The planting in each of the villages, which differs somewhat on each mesa because of the differences in ecology, involves an enormous elaboration of ritual, one described by Cushing and Fewkes and others. Ritual and corn and water are all intricately linked with social organization. In many respects the plant-water complex is at the very core of Hopi cultural life.

Because of both the shortage of water and the constant wind shifting the earth and the sand, fields had to be carefully selected and planned. Several supplementary plots were used by each household to ensure at least some return, rather than investing all of labor in one plot. We have discovered in the last decade that traditional farmers all over the world don't put all of their eggs in one basket. I mix my metaphors: they tried to mix their plots to guarantee at least some yield against failure. This is the main crop insurance. So there were no fixed allotments for each individual household and that meant some decisions had to be made on a group level.

What was happening in Parker? Hopi farmers were assigned forty acres and planted these year-in and year-out. They later learned to hope that chemical fertilizers and water would replenish the soils. Mohave traditionally had practiced recession agriculture. As the

Colorado River rose and fell, they had grown corn, squash, pumpkins, beans along the banks. They, too, had gone into irrigation farming and had moved a long distance away from their traditional farming, earning more money, to be sure, from cash crops.

Salinity, a consequence of irrigation, has become a new scourge, lessening arable area and, as a consequence, income. One method of escape has been to rent out land to commercial operations for nominal sums. Risks are minimized, but so is potential income. How to measure the social and psychological effects of non-activity is still unknown.

Hopi settlers had come to Parker at some considerable expense. They were separated by space from relatives, initially frightened in anticipation of the worst in the unknown. They were under pressure from traditional leaders and told they would bring disaster upon the entire group.

There had been an appeal to individual role holders, those who were active in the ritualistic societies—if you go, who will replace you? If somebody plays a role in the secret society, that person must train somebody else to take over. If no one is trained this way, that role in the society may disappear and the society may cease to exist in a village. They were told they couldn't carry the rites to Parker, that the rituals had to be kept at home where the kiva was, where the sacred points were, at the center where the earth saw the beginning of man and woman. The ceremonials had to take place there, not in another part of the world, no matter what other assets the newly found place might seem to have.

The traditionalists felt the religious isolation particularly deeply. They had promised to return for the major ceremonials and during the first year most of them were able to do so, often to the annoyance of extension personnel who saw crops irresponsibly deserted by their growers. Over time, however, attrition was severe. Older men talked about the need to have at least one local society, but this clearly would not satisfy ritual needs. Converts did not face such problems; missionaries soon followed them and, indeed, an area was set aside for the construction of churches. It was facetiously known later as "God's Little Acre."

Why did they leave Hopi? To search for land and water; or with thoughts for the children's future; or to get away from the theocratic structure. Especially in the case of the converts, this was a needed escape. Others talked about the close living that made life unbearable; this came especially from ex-GIs who now didn't want to be watched by their neighbors, Navajo or Hopi.

The Hopi community was one of transplanted traditional persons, not homogeneous but with different factions, and with prevailing suspicions of motives of their neighbors. Suspicion came out in distrust, hostility, and uneasiness between the Christians and non-

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Christians. When the traditionals proposed before one Christmas that they have a Santa Claus at the community celebration, the converts asked why?

Of course they had a good reason: the traditionals wanted to prove that the Christians really believed in kachinas after all, with Santa being just one of them. This in fact was a plot to embarrass the Southern Baptist missionary and he fell for it, proving a point for the traditionals. This kind of hostility and uneasiness was a major issue among the settlers.

Any view by the BIA of the Hopi as homogeneous, or as a group of people who believe in cooperation rather than competition, simply has no awareness of mesa history or the active factionalism that prevails among them. On the other hand, there was some ambivalence towards the Bureau, but not with the negativism of the Mohave. Let me put it this way—I saw the movie "Fort Apache" years ago with a predominantly Mohave audience. Every time an American soldier was shot by the Indians, the audience rose and cheered and roared with pleasure. I saw the same movie at Keams Canyon on the Hopi Reservation. That audience groaned when a cavalryman fell and when the Indians, in this case Apache, were shot, they cheered. Now, was this an attitude towards Apache or one of mixed identification? I thought sometimes it was the latter. This was a major problem in regard to the dealings with the Bureau. The Hopi certainly began to fear the Mohave but they were open to the Bureau personnel, despite early incidents of stock reduction and the trauma it had caused on the reservation. The Hopi had no knowledge of a Mohave raid on one of their mesas in the 16th century, so one couldn't talk about that kind of warfare and hostility; they had no preconceptions to speak of and I saw no negative stereotypes among them.

But something else happened: people got married. Intermarriage takes place throughout sectors and strata of American society. I thought it wouldn't have special implications in Parker anymore than it would anywhere else. I thought marriage would blend their cultural differences. But what happened in the case of Hopi and Navajo or Hopi and Mohave where there were traditional antipathies? The first marriage occurred between a tall, handsome Mohave and a tiny Hopi woman. In no time at all their son was born and the Mohave grandmother spoke of her "Hopi runt" grandchild because he was small. Some Mohave men were talking about what would happen with this kind of marriage. "Our people will reduce in stature; they won't be eligible to join the Marines anymore."

That child died of severe illness. Mohave believe in and practice cremation; Hopi inter their dead. The Hopi grandfather, a lay preacher, organized a funeral and this was held with the consent of the Mohave grandparents. When it was finished, six Mohave men came in and

carried off the casket, taking it to the cremation grounds. That night the appropriate Mohave ceremonial took place. Now the question rose, "If we are adopted, will we become Mohaves? Will we have to change our ways with regard to burial, to male-female interactions regarding questions of property? These kinds of confusions and worries became dominant, in part explaining why many Hopi didn't build houses.

The Hopi had moved from the dibble, from the planting stick, from dry farming, from seepage farming, to abundant irrigation. They moved to alfalfa with five to seven cuttings, to crops in place, to ready markets, to excellent prices. They got cash for the first time, acquired debts running into the thousands and learned how to repay those through supervised credit. One must concede that the Hopi repaid their loans and this was the major compliment they got when I would ask how the project was going.

They moved from dibble sticks to tractors and people died at first when they couldn't handle the machines but eventually they learned. They moved to grain sorghum and some corn, but not very much; they did not grow blue corn. There were a few gardens around the houses but not many—some squash, a few beans, but on the whole the gardening practices so highly developed in Hopi country went into discard. As one woman said, "You could buy cans of beans, later frozen beans in town." They began even to stop farming, relying entirely on their rental fees.

The temptation to lease land to dominant white corporations, which of course wanted this land because of its irrigation facilities for melons and other crops, was too great. Why farm, why work, especially at night in irrigation, when you can just give this up and get a reliable source of income, though somewhat smaller, from the corporations? From subsistence, they went to cash cropping to becoming, as it were, rather dubious leasers or landlords. Certainly the project was doomed to failure, I thought. It became clear as Navajo increased in number in this project, there would be new problems.

The Navajo, whom I have not discussed, were quiet during this early period because they were very few, but by the 1950's there were very many. It was clear that now new relationships were to take place. The tribal council could always dominate over the Hopi settlers but they could never ultimately play an independent role if many Navajo came in. The Navajo comprised the most populous Indian nation in the United States and if they were to be moved down to Mohave in significant numbers, then the political situation would be potentially serious.

In 1955, many Navajo came, applied for settler status, came down to work on some of the irrigation schemes in the meantime and saw the land and knew it was good. A member of the Navajo Tribal Council came

down, now feeling secure and cocksure because of the wealth the Council was said to have through coal and uranium and natural gas. He said, "I like this place; I think we'll buy it." He had in mind the entire reservation and the local people and the tribal council were offended by his rudeness and were worried. Soon after, seemingly out of nowhere, an injunction was obtained in the courts and all resettlement stopped. This meant the end of the Pan-American Indian center, no realization of the pueblo apartment houses, modern versions of hogans and an influx of peoples of the Colorado and its tributaries. There was a return, not to the past, but to the sore, annoyed, angry situation that had developed during the period when the tribal council had its many disputes with the BIA, exacerbated by the uneven treatment by the Bureau during the resettlement period.

The situation was not a question of cultures in conflict. Questions of cremation versus burial, matrilineality versus patrilineality are issues that would be resolved and indeed were being resolved in individual households in different ways—for the most part, reasonably satisfactorily, with no greater degree of marital discord than is found elsewhere. These were not major issues; the major issues were the realistic problems of competing for political power, for wealth, for land, for buildings, for machinery. There was competition for the limited financial allocations of the BIA, for attention from the limited and sometimes doubtful utility of Bureau personnel. Cultural differences resulting in the injunctions against peyote use by Navajo was really a disguised device to stop the potential invasion from the north.

Many of the problems that occurred could have been obviated or avoided. For the most part, the difficulties were artifacts of a lack of cultural sensitivity by BIA mismanagement. No matter who was responsible, it was quite clear that this attempt at pan-Indianism, this attempt to bring Indian nations together as brothers and sisters sharing minority group status in America, was aborted by the unwieldy and uneven and sometimes injudicious handling from those who were presumably implementing the program.

One last note: what about the blue corn for *piki*? You can buy it now in the trading posts. It's shipped down to Parker by sack via truck from Hopi country. Where are the settlers today? As of September 1988, there are 18 Hopi families, combining just a handful of extended families, interestingly representing the two different factions that had that tug of war in Oraibi made famous by Mischon Tittiev. There are nineteen Navajo families but no more than that and clearly no more will come. They have moved from subsistence, to cash cropping, to something much more dubious: the uncertainty of becoming leasers of their land. •

These were not major issues; the major issues were the realistic problems of competing for political power, for wealth, for land, for buildings, for machinery.

Economic Motivations—An Iroquoian Perspective

John Mohawk

In the past few years there has been an effort among some of the Iroquois Indian peoples to discuss how what we now call economic life was organized prior to contact and the colonization period. How were decisions made, what was the principle of management during that time?

I begin by conceding that this discussion will probably go into the future without really satisfying everybody and that the discussion will probably never be settled in any really concrete way. This discussion, however, has not so far taken place on any serious level, with any great intensity and certainly has not had anybody around looking for an application to it. So let me frame it for you and maybe it would help us to have some ideas about how to do things in the future.

There are two reasons I came to this discussion. One is the work I do on economic development in Indian country. If you want to do successful economic development in Indian country, you eventually have to conclude that you must do it in the Indians' own terms. You come to understand that economic development in Indian country is really not just organizing the materials and labor to produce wealth. It is also coming up with a way people are comfortable in moving forward, doing what they need to do in order to meet their needs. Indian people, all people, generally want to do that in ways that feel culturally comfortable. If there is one thought that culturally-sensitive economic development as a term raises in Indian country it is the question of appropriateness. Does this destroy our culture? Is it appropriate for us to do a, b, c, and d?

Given that as a good background question in the

communities, the other question that arises is, what would that term have meant if we took the idea that there would be development around wealth and the distribution of wealth and material goods. If that's the concept, then, what do those words mean? Let me say that they don't mean what they mean at the Wharton School of Economics, they mean something different, and so, we have to start from there.

The other reason I got into it, though, is because of contemporary thinking about management styles. Anybody who's familiar with this knows that Americans in the last decade or so have been willing to look at non-western ideas about how to do management and how to organize productivity. This is especially true because the Japanese seem to be so successful at it and Americans have looked there for inspiration for their own organizing strategies. What impresses about the Japanese is that they seem to know how people put their energies together to solve problems in a structured way. I find this cultural ability among the Japanese interesting and not at all contradictory to Iroquoian ways of thinking about how to solve problems.

So those two things spurred me to go into this and try to exhume, almost, or to do psychological autopsies, of Indian economic planning or pre-Columbian thinking about the economy. It is that, certainly in North America, because the reservation experience is not an experience in Indian economic thinking or in economic development. The reservation experience has been an experience to stop Indians from thinking like Indians and to make them think like missionaries and bureaucrats. By reservation I don't mean the geographic

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but rather the social experience of the reservation, looking at that as a problem, so we can then start to look at the long range view of what we have that has survived as our culture and raise the questions around what has not survived and what can we reconstruct from what we already know. The point is: how can we ask some proper questions?

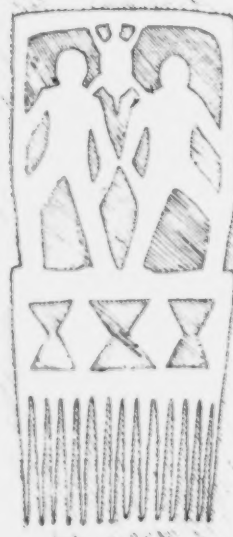
So let me begin that process by pointing to a period in history, a moment in history when the question has a flash of clarity to it. It's a late moment; it's not an early moment.

There were several generations of contact between the Iroquois and the west by 1687 when a French expedition under a governor of Canada, called Marquis de Denonville, invaded Seneca country and conducted a scorched earth military campaign among the Seneca villages along the Genesee River, south of present day Rochester, N.Y. In 1687, Denonville mounted the largest European military force ever assembled in North America and they marched against what was probably also the most formidable indigenous army in North America at the time, the Iroquois confederacy, the largest in number of the Iroquois being the Seneca.

That spring, Denonville's army launched a surprise campaign into the heart of Seneca country. Today we call the site he first reached, burned and razed to the ground, "Ganondagan." It's a Seneca word meaning "white" or "pure town." Ganondagan was the home of a woman named Jikonsaseh, who was called "the mother of nations." She figures prominently in the founding tradition of the Iroquois confederacy, and has received attention here and there as a prototype of female culture heroes. At any rate, this Seneca town was attacked in the summer of 1687. We know a lot about what happened during this campaign, what conversations took place, what preparations were made, what happened on an hour-by-hour basis in the army. A good number of people on the expedition kept journals. Then, too, the English were interested, and British intelligence even then was pretty good at keeping notes. They went around after the fact asking people what happened and for a generation after that, everybody who could seemed to write down everything they could remember about everything that happened all through that period. So we actually have a good memory of that, considering it happened 300 years ago, far from the borders of what was then considered civilization.

Denonville's expedition reached Ganondagan at a time when the Seneca men had left the villages as an army, as Iroquois armies left their country at that time, and pretty much all the fighting, able-bodied men were headed for the Ohio River valley to do violence to the Illinois and Miami Indians. So the town was left pretty much in the hands of the women, children and old men, when the army showed up on the lake. The people had

...how can we ask some proper questions?



Drawing of comb found at Ganondagan

Although each of them also raised corn, the Seneca had a reputation without any question, even among the Indians of 1687, of being the bread basket of the confederacy.

a few days advance notice that the army was coming and they went to meet them. They engaged in a battle, actually the kids, teenagers and some women and old men ambushed the whole army as they marched down through a ravine, probably not far from the present day football field in Victor N.Y., and in the battle that ensued the French army very nearly panicked and ran but they outnumbered the Indians at least five to one and they won the battle.

The next morning they marched up the hill towards the Indian town and the first thing they could see were huge towers that they imagined were battlements of some kind. As they got closer they realized that the village itself, the actual structures where people lived had been burnt to the ground but they had left behind corn bins. On that far hill, which they called Fort Hill, there was a palisaded area on top of a mesa of sharp edges on all sides. That's where they saw these huge cylinders that they thought were fortifications. The Indians had all fled the place and there was nobody there to resist their coming into the area.

The Seneca women and children had gone down into the Canandaigua lake area and then they had sent their young boys on two directions, one group of them went east to Onondaga to call for the rest of the Six Nations to come, call for the Iroquois army to come and help, and the others had gone into the Ohio valley to find the village men and bring them home.

There was a period then where the French army had control of the Seneca country, where the Seneca had abandoned it but were assembling what the French knew was a formidable army. The French knew they hadn't killed many people in the battle. They knew that the Iroquois could put together an army of three or more thousand people and they knew that they wouldn't let that invasion go unchallenged. So the French army chopped down corn, and killed all the trees and did what they could to destroy the food supply, figuring to starve them into submission the next winter. While they were in this process, however, they leave us records of what they discovered on Fort Hill, in that palisaded greenery about three-quarters of a mile from the main village. They discovered there that those

large cylinders were actually filled with corn that people had brought there and deposited there. They discovered that the town we now call Ganondagan was in fact a major grain storage town for at least the Seneca if not the whole of the Iroquois.

Any time we quote a number on something that happened 300 years ago, the number is open to challenge and I'm willing to say we can't be certain on the numbers, but the French army guide said there were three million bushels of corn in that granery. Of course, another guy said, well, it was less than that, and other people are arguing it could not have been anything near that and it's true, military guides inflate the number of casualties of the enemy and inflate the size of everything they see. So even if it were down by a factor of three or four from the guide's assertion, the description talks about four large containers that were filled to a high height and that there was a lot of corn stored. Also, many hundreds of acres of corn were destroyed by the soldiers.

This raises a few questions about how things are done, because we know a lot about Iroquois social organization already that most people won't dispute. Everybody would agree the Iroquois are matrilineal, the women probably produced most of the agricultural products—corn, beans, potatoes, etc. We probably can agree there were fairly predictable organizations of women workers.

But now the questions are: how did the corn get there, who planted it, who organized its planting, who got it harvested, who put it on their backs and carried it up there, who put it in the cylinders in the first place, and then why? Why did the people do all of that? And then beyond that, how was it distributed after this? Who got it? Where did it go after it was in the cylinders? Remember that each village raised enough corn and kept enough corn in the towns to feed themselves, so whatever it was that was in the cylinders was not subsistence winter corn for everybody, although it could have been emergency corn in case somebody's corn crop didn't come in or burnt by accident in the winter. But it would have taken a lot of corn crops to burn up

and an extraordinary amount of coincidence to assert that this corn was there for emergency purposes. The second best explanation is that the corn was there to feed the armies of the then Five Nations: the Mohawk, Oneida, Onondaga, Cayuga, Seneca. Although each of them also raised corn, the Seneca had a reputation without any question, even among the Indians of 1687, of being the bread basket of the confederacy.

I have to suggest the corn was there not as a subsistence item, and that they didn't trade corn to any degree that any document in history tells us. They did not use corn to sell to the colonies to make money. In the period when they had some writing, we have no evidence that anybody was an accountant. There did not seem to be a cadre of CPA's or lawyers dealing with who got what and under which circumstances and to keep records of all of that. Given that that bureaucracy doesn't appear to be evident in the Iroquoia of 1687 we have to ask the question, how did decisions get made about how the corn was moved from where it was to the next place it was going to go.

I think the existence of that corn raises other kinds of questions. We have hints throughout the history that other Indians came to Irondequoit to barter and what they bartered was meat for corn. We are talking here about Indians coming down from the north to trade in an informal economy system that took place, really, beyond the frontier and that had very few witnesses to it and not much documentation about it but is consistent. So you have the possibility that some of the corn was there for the purpose of bartering.

Now, another question: once bartered who got the goods it was bartered for and how was that distributed? And remember now, what we have here in Iroquoia is a government, if you can call it that, (maybe we should call it a culture and hold back on the issue of what constitutes a government), but anyway, decisions were made without any method of coercion to enforce the decision. There were no policemen, there were no tax collectors, there were no courts, judges, there was no penalty for people who failed to act on a thing called the public interest and no one who decided what the public interest was outside of what we would have to call consensual meetings. So somehow, through this process of what we have to believe were consensual meetings of the towns, decisions were made to grow this corn and you cannot tell me (because I know Indians) that this happened by accident. It had to be organized; somebody had to say, yes, we'll plant so much. Then, once that was decided they had to pick somebody that actually planted and then have somebody to wake up in the morning, go wake that person up and point them to the garden and get them over there to plant and do all the things that have to happen to organize a production. Somebody has to make sure that it's planted, cultivated, harvested, braided, put in the basket, and carried from

*...the French army guide said
there were three million bushels
of corn in that granery*



1575 French version of burning longhouses

here to the next place. Somebody has to say this goes here and that goes there. So, how did this happen?

The Iroquois have maintained or preserved an oral tradition of who they are and how they do things to an intensity that has been lost among other, at least surrounding, peoples. Only in Iroquoia can you have a heated discussion about whether it was the Clan mothers or the Chiefs who made the decision of where to plant the corn. It's the only place you can go, at least in the northeast, and have animated discussions about how something must have happened 300 years ago based on competing and contradictory oral traditions coming down through families and communities.

When you walk into some of the Iroquois cookhouses, what they call cookhouses or mudhouse, the little house next to the long houses, you walk into an environment, a woman-run environment, which has a way of handing out the next priority of work that needs to be done, which I have never really experienced anywhere else. It's by custom, but it's also by design and it's a way of looking at the world through woman's work organization. A lot of people who study this by the book walk into an Iroquois longhouse believing that no one is in charge, that everybody does what they want to do. They soon find out somebody is boss, in fact, elected to be the boss and once they are the boss, they are in charge, they tell you do this, do that and if you don't want to do it, you don't have to, you can leave. But there is a way of organizing this thing in which somebody who's appointed to the job has the right to decide who does what and if you want to be part of this you do what they tell you to do. Just like working in a factory, there's an organization principle.

Today there is widespread discussion on the reservations about the idea that Indian people ought to have their own economies. What economies are is, I think, less clearly understood than I expect them to be understood in a few years. When people who haven't had any opportunity to have an economy, and you should understand that the reservation was a shutting down of Indian economy, when such people are faced with the mission to redevelop that economy, they have to look somewhere.

Things have changed by now. The army is gone and they have been gone for a while, and the missionaries are pretty much nice people today and don't bother you too much and the school systems are off the reservations and aren't kidnapping people in the middle of the afternoon, and there's just a generally different environment around. You can go into town and the white folks will buy your products, if you've got something to sell, in fact the white folks will come to you and play your bingo and buy your cigarettes. They are pretty much amiable folks. The environment isn't like it was in 1850 or 1860 when the question was, are



Marquis de Denonville.

*The purpose of group decision-making is
to look at the quality of human life that results from the social
environment we create by our thinking.*

they going to come and kill us this year or next? And now the question is raised in Indian country: what is an Indian economy?

I would like to suggest the question goes beyond Indian country, it's a question for the world. But the discussion goes on in Indian country because people are saying, if we had an economy, if we reconstruct an economy, how do we solve problems about production and distribution, what do we do about dealing with people? What do we know about how to motivate people so that the motivation is not always the carrot and the stick? How do we make people have ownership of their own motivation? How do we give people a good feeling? If you listen to the Iroquois cultural teachings, everyone has to feel good about what they are doing, and if you are serious and you feel good about what you are doing, you'll do it better. So the question has always been, how do we ask what we know about human motivation and human organization; how do we use that to benefit people and to be productive and to construct an economy? And I'm sure this discussion will go on for quite a long time.

Just broadly, I'll mention that there are two fairly well articulated, fairly well informed theories about how the Seneca country was organized in 1687 to bring the corn to the corn crib. In my mind it's been one the questions I've been asking our experts, the people in the oral tradition for a couple of years. Almost on every occasion I get, and if they sit down long enough and if we can get a conversation going on this topic, the conversation always goes to the idea that we need an economy, no one I've heard disagrees with that, and then it moves on from there to the issue of reconstructing our economy in our own values and not many disagree with that, although a lot of people are not sure what that means.

Then it goes on to the next issue of models. There are two models I hear: one model says that the term "Hadianessah" means those people who had that title in 1687 actually were leaders of workers. What you had was the men workers of a clan who elected the person who was the best motivator of people, who elected him,

picked him as their leader and that gave us the chiefs, what we call Hodigowani. The village chiefs carried out the orders, whatever it was that Hadianesah decided on, I guess you call it the confederacy chief vs. the local chiefs. The other model says that the first model is a little wrong, that in fact Hadianesah had nothing to do with the economy, that the Hadianesah were strictly chiefs who dealt with foreign affairs and with national federal affairs but that the leadership at the local level was these Hadigowanis, local chiefs who took care of looking after the affairs of the villages and when they got it together they formed basically the chiefs council of the, say, the Seneca nation.

When they all sat in one place, if they made a decision to do something, they would have appointed somebody to organize the work of building those bark dwellings, they would have appointed the person most appropriate to do the job. This is not that different from the way things are done in lots of cultures today, where things are done by appointment: you give somebody the power to do it and then they carry it out.

The issue about how to motivate people without coercion though, is the one that stimulates my involvement in this. I know that the theory of how you get workers to work at their best is that you set up a situation where if they don't work they starve. This system of coercion has formed the basis of a lot of economic thinking in the West over the past couple of centuries. That wasn't even a possibility in Iroquoia, where the laziest bum had a right to all he could eat all the time, where it was inconceivable that someone would starve when someone else had food to eat. A lot of people know that this was a general way of being among most Indians, but most people don't understand that it fits so nicely into the other things that are Indian.

What is Indian is you do not let a lot of internal antagonisms fester and grow because antagonisms are upsetting to the community and take up a lot of time and energy. So mechanisms are in place to try to deal with any kind of conflict that would arise within the community. The quickest conflict you could have is to deny someone something to eat, so all the fundamental

"Let us put our minds together to see what kind of life we can make for our children."



needs are already guaranteed. We won't deny anyone anything to eat and everybody will share everything and then we can get on from there.

What I get out of the thinking is to remove all the barriers that would cause all the discussion and grumbling and nitpicking that currently seem to characterize reservation life. Put all that out of the way so we can get down to work. Then, it seems to me, too, the Indian community was built around the idea that once we all agree on what is going to get done, everybody has to own the decision, everybody has to move forward with the program, the whole program has to be group oriented. In a way, that sounded rather romantic until people started reading all those interesting stories about how the Japanese use that to make the best Toyotas. All of a sudden it got to be a good thing to do.

I think that the Indians face a really interesting kind of a problem in that in the reservations there is no accepted precedent, there is no custom that the reservations in my area of the world have agreed this is the way we do things. They haven't really accepted the

outside world's assertions of how it ought to be and they more or less have been without the use of their own way of doing things for quite a long time, so the rediscovery has some important elements to it. I find it fascinating hearing some of the really bright lights of our culture addressing those questions for the first time in generations.

Finally, I want to say this to all those who say that the Iroquois Indians and the other Indians were not real ecologists. First, the word "ecology" didn't exist, so of course they didn't know that they were, if they were. But secondly, the Indian objective is real clear in the thinking that founds the culture. The purpose of group decision-making is to look at the quality of human life that results from the social environment we create by our thinking. You get that thinking in the Iroquois Thanksgiving Address and in the concept of the Seven Generations and in some of the most famous quotes to come out of the people like Sitting Bull, when he says "Let us put our minds together to see what kind of life we can make for our children."

When you look at economic thinking, you have to

look at the quality of life, the lack of coercion, the possibility that people would have access to what they need to produce, food and heat, the idea that humans live on the land and that if they don't live on the land something is very very wrong. The idea that children have a right to grow up to be powerful, to use their minds to the best of their abilities, not just to get a degree, but *to use their minds to the best of their abilities*, is one that needs to be shared in one of those non-coercive decision-making processes where everyone who's responsible is required to come to ownership of the responsibility to get the work done. Those are really important principles and they are done of course in a cultural context and they are the ones that we are struggling to try to understand, going to the people who hold the oral tradition and trying to understand how that works through. For instance, we look at the Great Law of Peace (See *NEIQ*, Vol. 4, No. 4 and Vol. 5, No. 1), to try to understand how it informs that need, and then try to look at the world we live in today and try to figure out what does that mean: what we do about that five acres this spring? What do we do about housing? What do we do about this and that?

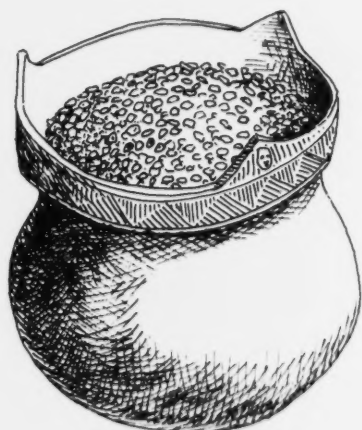
Now I don't want anybody to say that I came here and said that the whole Iroquois country was engaged *en masse* in this discussion. It's not that way at all; a few people here, a few people there, small communities are talking about it. But there is a lot of hard thinking going around it and a good share of what I perceive to be the movers and shakers in the Iroquois community are engaged in that question. It is the first generation that's had that question to deal with and I think that on some level it's a real exciting time, also very painful and sometimes very confusing time for people but it's not a static time, it's a dynamic time.

The historical and scientific investigators are speaking now to the people who carried the traditional culture, the oral culture. They are speaking to the informed elders, which I think is a real technique that has promise in the Indian world and that was also, I think, the only reason that the elders ever really approved that any Indians would go off into the economic world in the first place. If we are going to get serious about doing something to look to the future in the United States we are going to have to reevaluate the hydroponic gardening technique or hydroponic agriculture that the Mayans used to have, we are going to have to look at reevaluating the kind of irrigation systems that the Indians had here in pre-Columbian times all the way down to Peru. We are going to have to say that maybe some people who did agriculture for some purposes other than the purposes that we've had in the last century had to have some good ideas about how to do things and then we might have to reevaluate our relationship to food crops. •

What do we know about how to motivate people so that the motivation is not always the carrot and the stick?

Some Cultural Meanings of Corn in Aboriginal North America

Alfonso Ortiz



I originally thought to entitle this presentation "Men Made of Maize," but then I thought I might get some feminists after me, so I backed off and gave the more neutral title. But I would mean human kind, the species, not just the gender, for indeed the great cultures, the enduring cultures, were all built on maize.

From the Andes, up through Mesoamerica, throughout Mexico, into the American Southwest, through the Caribbean, into the Southeast, and Eastern Woodlands, corn made the higher cultures possible by permitting concentrations of population to remain in one place. It is how these peoples who have had corn for a long time have celebrated it in story, song and dance, that I would like to talk about tonight.

I shall also talk about corn in four senses, using evidence from Native North American expressive cultural life. I will speak of corn as mother, as enabler, as transformer, and as healer. Those four categories sum up the various ways corn has been thought about metaphorically. There are others, but they are relatively minor traditions, at least to my state of knowledge. Many Native American peoples knew and know corn in two or more of those senses at once, of course, including

the people who provided me with the first and most extensively developed example I shall use this evening.

But first, where did the term "maize" come from? For those of you who don't know, it is a Taino or Caribbean word for this great staple crop of the islands and mainlands of the Americas. Taino is a language spoken by an elite group of Arawaks, and the Arawaks, of course, were the people who first greeted Columbus. So the term "maize" entered into European languages through Spanish early on.

The most extended example I would like to share with you comes from a culture familiar to me because it is my own, the Tewa speaking Pueblos of North Central New Mexico. I'd like to develop my example in some depth to give you an integrated sense of how other corn-revering, corn-using cultures develop their relationship and partnership with corn. The Tewa speaking Pueblos speak of two corn mothers who were present before the emergence from a former life within this earth: a white corn mother and blue corn mother. The white corn mother is spoken of as being nearer to ice, as the mother of the winter people and the blue corn mother as being nearer to warmth, as the mother of the summer people.

Tewa society divided each of the six villages into winter people and summer people. In anthropology, we term this phenomenon a moiety arrangement. There are many peoples in the Americas who have or once had such a dual division of the communities. In this case, it is winter and summer; elsewhere it could be north and south. In others of the Pueblos besides the Tewa, it is turquoise and squash. It could be any number of metaphors taken from nature. In Tewa, the basic model is provided by the sexes, because winter is male and summer is female. Winter is essentially colorless, white, drab and associated with a hard mineral substance; summer is associated with a solid, vegetable substance and colorfulness. All of nature is divided up like so between the two. One has to understand this to understand what else they do with the subject of corn. Blue corn woman is the original mother of the summer people and white corn woman the mother of the winter people.

Now, so important are these dieties that in the origin tradition the people are said to have returned three or

four times back to the underworld from where they emerged because they found themselves essentially incomplete after travelling south from the emergence point. They discovered that they were all sad and nobody was laughing and so they returned and the mothers brought forth the clowns to entertain them. The people went on and migrated south after a while and they discovered they were getting sick and there was no one who could cure their illness on this earth surface world. So they returned once again and this time the mothers brought forth medicine men, curers, to heal them as they travelled. They returned yet again because they did not know how to defend themselves against hostile peoples they found on the earth's surface. This time the warrior chief was created to protect them in these hazardous places. And ever since then, whenever Tewa need something, they ask the mothers or invoke the mothers in hazardous undertakings. For example, before speaking, a Tewa representative or leader will say, "I am here by the cough of our mothers," meaning by the will of the mothers and thereby invoke the original corn mothers in what they are about to say, what they are about to undertake.

Let me trace it a little bit through the life cycle. From the very day and first moments of birth, two perfect ears of corn, one white, one blue, are placed on either side of the newborn infant's cradleboard for twelve days. They must be perfect and they must always be paired, invoking both corn mothers, no matter what moiety the child is born into (usually determined by the father's moiety). Even if the child is of the winter moiety, the blue corn ear is laid along the child's cradleboard. If the child is of the summer moiety, the white corn ear is laid out because you don't discriminate at the beginning of life, you invoke the protection of both. It also shows that membership is flexible; the child could go either way.

Now, if a summer child becomes sick in the first year of life with a fever and only the winter people can lessen a fever, then the child is presented as the child of the winter moiety, away from its father's moiety. So no matter what else happens he is expected to be initiated into the winter "kiva" and the winter moiety. It is complex on its surface but it works well in practice. So the two ears of corn protect the child for twelve days after birth because the original great journey from emergence to where they are now was undertaken in twelve steps. So twelve is a sacred number that is invoked over and over again. From birth, the corn mothers are invoked in a Tewa child's life. After the child is out of danger or after twelve days the ears of corn are put away to be planted in the family fields, in the name of the child.

In everyday life, most Tewa prayers begin with a particular phrase. On an important occasion, you say, "by the cough of the mothers I am here," or if you are in a strictly winter moiety religious activity you say, "by the cough of our mother, white corn woman near to ice, I speak today." It varies, but usually both mothers are invoked. Most Tewa prayers begin after the phrase, "by the cough of our mothers." The next phrase is, "As it has been left among us from the time of the earth's dawn, when all was young and green."

You invoke the beginning, the time, the moment of emergence. The original home is described in stories and in song without end. The first village home that the Tewa people built on the earth's surface after emergence is described as "dewy corn structure sacred village," or "dew enshrouded corn structure sacred village." The attempt is clearly to invoke the very beginning. The very beginning is believed to have been a time when the earth was still young, dewy and green. The original people lived there in that village.

The overwhelming number of stories have to do with a deer hunter and one or more corn maidens, their

*...corn made the higher cultures possible by
permitting concentrations of population to remain
in one place.*

relations with one another while together, and their relations while apart. A typical scenario occurs when the corn maiden wife is abducted by a deity and a great quest ensues and a contest is set in motion to see who will keep the abducted wife, the husband or the deity—abductor. There are great dual forces anchored in the sexes: male—female, hunting—agriculture, winter—summer, lack of color—presence of color, cold mineral substance—soft vegetable substance. Because all these forces are contesting, the stories have similar plot structures. The story usually represents a subversion of the normal order represented by the balance in the forces in nature. For a time the sexes get along together, producing children, and then comes a disruption in that harmony followed by an attempt throughout the plot of the story to restore that harmony, because so keen is the sense and the desire to have that balance always there.

One can always read thousands of pages of Tewa stories or listen to them for fifteen, twenty hours, but if you keep in mind that they follow that essential plot structure, an intrusion of disorder in their world of balance and of harmonious opposition, then an attempt to restore that harmony, it helps one's enjoyment greatly. There is usually a deer hunter and a corn maiden but there is also an independence between the two "moieties"—winter and summer—and they tell their stories differently.

I found out, much to my dismay, that summer people infuse their stories with summer scenes and the colorful ears of corn, the blue corn maidens, the red corn maidens, the yellow corn maidens and the like. Winter corn people infuse theirs with their austere winter scenes and only the white corn maiden. There are other specific moiety symbols that occur but why I say I discovered this to my dismay was that I got most of my stories from my kind of people, winter people, and so I only have half a handle on Tewa story telling. But I have enough of a handle to assure you that there is this desire to restore harmony that has been disrupted, and that harmony is preeminently represented by the deer hunter representing maleness and hunting and a corn maiden, representing females and agriculture.

There is one great game, *shinny* that is still played once a year, usually in February. Every household in a given community takes a handful of grain of cultigens, all the seeds of cultigens, but preeminently corn. They take them to the home of the chief of the summer people, who takes over as chief of the whole village at the end of February. He takes at least one kind of grain, the kernels of each household and puts them into a great leather ball painted yellow and black. The men and young men of the village take that ball and they bat it around with shinny sticks. They choose up sides, often determined by moiety and by which part of the village they live in, and often determined by married

versus non-married. In any case, they play this ball all day. By the end of the day, no matter how well it is sewn with deer sinew, the ball begins to break apart. The men of every household try to have the ball be on their fields when it breaks apart because it is said that the person who gets the spillage of the seeds from the ball will have the best crops for that year. Sometime during the day the seed ball, the great seed ball, is opened in someplace or another. The most important seeds in that ball are corn. The invocation of corn occurs once again.

That is a major game of the year. When I was growing up we played that game all during the spring and boys could choose up sides just the way we do for sandlot softball games at the present time. If the game is between married and unmarried men, the losers of the first game usually have to put on a transvestite dance with their spouses and mates. At least in my lifetime, a shinny game has been played between unmarried men and boys against married ones. Usually the married ones get trounced handily because they are older and out of condition. If they get beaten, they and their wives must put on a transvestite dance a couple of Sundays later. In the transvestite dance, usually they come as Navajos from the south. They come in covered wagons as if coming up to trade, dressed as Navajos, but the men are dressed as Navajo women complete with styrofoam breasts. Of course, the women are dressed as Navajo men with long mustaches hanging down to their chest and it is a very humorous scene. They set up a tent right in the middle of the plaza, and they also pretend drunken behavior. They have ice tea and kool aid in wine bottles, which they proceed to drink rather quickly and stagger around and so on.

One of the major Navajo towns in New Mexico is called Shiprock, named for a great rock that looks like a ship. And the Navajo people are often thought of as pronouncing some consonants in one way rather than another way. Once, I stuck my head in this tent, just to go along with the flow of good humor and good feeling and I asked, "Where are you folks from?" Whereupon a Tewa woman dressed as a Navajo man quickly shot back, "Shitrock!" Anyway there is at least one Navajo colleague in the room tonight, and I hasten to assure her that lots of Navajo people come to that and they enjoy it enormously. Just as they enjoy Hopi versions of the same thing. Because we all win life if we participate in good spirit in the ceremony. These activities reverberate throughout life and it is not just a game, an isolated Saturday or Sunday but a continuous way of life.

All religious positions—all priests, no matter what they are, warrior chief, chief of the hunt, winter chief, summer chief, priestesses, clowns, medicine people, as part of their initiation—all must have a corn mother. Their symbols of office and religious paraphernalia differ, the materials that they use may differ, their prerogatives differ within their respective societies, but

every one of them must have either a white corn mother or a blue corn mother, depending on their moiety. The corn mother for the winter people is white and that for the summer people continues to be blue.

There are in Tewa at least two dances to honor corn. In San Juan Pueblo, we have a green corn ceremony, which is nearly universal throughout the Pueblos. So the thinking about corn is the same. This is not just Tewa. I am giving you detailed Tewa examples but in a fashion they apply throughout the Pueblos, through the Tewa, the Zuni, the Keres, and the Hopi. It is just that their focus is slightly different in each instance.

In San Juan Pueblo, we have the green corn dance and a yellow corn dance. These dances celebrate and sing of corn maidens emerging from lakes to make their tremulo calls in response to the singing of youths. A third dance we call a cloud dance honors the primary colors of corn in a ritually prescribed order: blue for the north, yellow for the west, red for the south, and white for the east. The women in this dance bring out ritually prescribed colored ears of corn in the order that places are named in prayers, chants, the order that dances are performed. So it is a nearly universal ritual prescription.

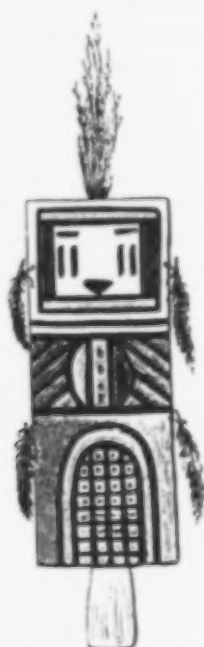
The Cloud Dance also completes the Tewa and general Pueblo equation of women, corn, and cloud into a fertility complex of symbols. A potent trinity of symbols for fertility—women, corn, and clouds—are almost interchangeable. Women imply corn, corn implies mothering or nurturing, and they together imply fertility in all of nature. So the dances are appeals for continued fertility, fecundity in all of nature.

Throughout the Pueblos, there is a recognition that it is necessary to sing the corn to maturity; to sing in order for the corn to grow up healthy and productive. So Pueblo men who do most of the work connected with the growing of crops from young boyhood on, were encouraged to sing to the corn and think good thoughts, otherwise the corn wouldn't grow healthy. I understand modern science has demonstrated that this is true; it is good for corn plants and other plants to hear songs to grow up healthy. Finally, at death, food is placed under the left armpit of the deceased, and most of the food consists of parched corn, or cooked corn. Even at death, corn sends the soul on its way, just as corn welcomed him or her into the world at the beginning of life.

The dominant metaphor for corn in Tewa thought is mother. Some Pueblos have more than one world level preceding their existence on this, the present earth surface. They have three other levels through which they emerged in succession. Those four worlds or four stages of life, of emergence, are linked metaphorically to the four stages of growth of the corn plant. The Pueblos think of the four levels as the planting, the crack in the earth when the corn comes up, when it forms leaves and then the cob, and when it forms tassels and matures by

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forming pollen. Somewhere in those they postulate four stages and think of each world as being like a stage in the planting and maturation of a corn plant. They also think of each world level as representing a completion of a lesson, like learning how to overcome evil, learning how to live together in groups, learning something else. The humans have to learn something as a precondition to emerge onto a next world level.

Always corn accompanies the people on their journey. Indeed, the Pueblos see corn as an analogy for life itself. Life comes from within the earth metaphorically, and in the case of plants, literally. From one end of the Pueblo world to the other, corn grows, to borrow a wonderfully vivid phrase from a Zuni prayer, "in a land replete with living waters." That's the ideal for corn to exist— "replete with living waters."

The Navajo people, by contrast, give corn low prestige as food. They revere corn almost as much as the Pueblo people do but for a different reason—because it yields the pollen, and the pollen is important in their healing rituals. Preeminently with the Navajo people more than any other peoples, corn is primarily healer—not mother, not transformer, not enabler. It's not that they don't eat the grain, it's just that it does not have the high prestige of meat. It's quite the opposite of Pueblo culture. These are people who live side-by-side and have been for hundreds and hundreds of years. They've just taken the same thing and attributed different meanings to it in their lives, that's all. They sing and honor it, and it's embodied in their genesis traditions, but it doesn't mean the same thing it does among their neighbors.

And just as the Tewa people do the complex of three, women, corn, and cloud, the Huichol people of northern Mexico do it with corn, deer, and peyote, to form a potent ritual complex. But in theirs, corn has a secondary role. Although they are not presently hunters, and may be mystifying themselves, which is not unknown in North American Indian religions, they believe that they have once been hunters, lived the hunting way of life. So hunting deer has the prestige, not growing corn. Growing corn is something they have to do to survive in their present circumstances and they do bury their dead with kernels of corn. (The women are buried with four kernels and the men with three.)

Some anthropologists have taken the Huichol quite literally and have postulated an earlier hunting existence for the Huichol people, in the mountains far away from where they are now. It is postulated that the Spaniards drove them from the mountains and forced them to settle in the lowlands where they could keep an eye on them. So their agricultural career began, but they still have a nostalgia for hunting. Every year, when they undertake a journey together to gather peyotes for ritual use, they metaphorically liken their peyote-gathering expeditions to hunting expeditions. They shoot the

magical peyote, it is a deer, and when the shaman shoots the first peyote button, all may gather because he has made the first kill, the first deer.

Beyond burying their dead with kernels of corn, the Huichol also cure with burning corn cobs. Their medicine people singe the patient's hair in regular group healing ceremonies with a burning cob and with this they treat some illnesses. It is not as elaborate as Navajo curing rites by any stretch of the imagination but they do invoke corn for curing also.

The Yaqui of Sonora have an origin story about how corn came to them. I thought it was charming. I hope you will to. I would like to read it to you.

In the times when there was no corn the blackbird told man about this corn that is sown. He knew where corn was and he also knew that the devil had it. Man sent the blackbird up there after it because he knew it was good at stealing. The blackbird went to the home of Ucu and sat on a branch and the devil said, "What is it that you are going to steal from me today?" The blackbird did not say. When the devil forgot him, the blackbird stole corn and returned it to man saying, "This is to eat. Make a little hole in the ground and bury it, take care of the corn when it is growing up."

The corn sprouted, but when it was still little, it was dying of thirst because there had been no rain. Man talked to the blackbird about it and the blackbird said, "I'm going up there to bring rain so that you can irrigate. When the corn has rain it will grow." "That is well," said man. And the blackbird went to the god of rains and said, "You know that man down there don't you? Will you send him rain?" "Yes," said Ucu the god of rain, "I will go down there right now. You go on ahead of me." So the blackbird went on and the god caught up with him and beat him and threw him about with wind and returned to his house. So the blackbird returned to man without any rain. "He said the god beat me about with wind. Send someone else to see if he can bring the rain."

Then man ordered the roadrunner to the house of the god of rain. The bird arrived at the house of the god of rain and said, "You know that man down there don't you? He wants you to send him rain." "Ah yes, I'll go down there. Hurry up and go ahead of me." The roadrunner had gone only a short distance when Ucu started throwing bolts of lightning at him. The roadrunner returned to man and said, "I could not get the rain because Ucu bit me with wind. Now send someone else up there."

"Alright," said man, and he spoke with the toad saying, "Toad, I want you to bring me rain if you can." "I can bring it," said the toad. He went to the house of Ucu sowing his children behind him on the road all the way. Then he said, "Ucu, you know that man down there? Don't you know he wants rain?" "I know," said the god of rain. "You go on ahead of me and I'll catch up." Toad began to return and within a short time the god caught up with him. Toad was singing and all along the road before him his sons were singing also. Ucu went from one toad to the next and the

next and arrived to where the corn was sown. He irrigated it and it grew, it formed ears, they ripened and gave corn. Then man had corn.

We desert people find things like this charming. The most unlikely creature succeeds. Not the swift roadrunner, not the clever blackbird, but the ugly toad. And he has been associated with fertility ever since, toads and their brethren, the frogs.

A deeper example is provided by the Pima-Papago. I should mention that the Papago no longer want to be known as the Papago. It was a name given to them by Spaniards. Papago is a corruption of the word Papave or bean people. Papave Awawtam, people of the beans. And since that wasn't what they called themselves they decided to change their designation and they are now known for the rest of their history. I guess, as Tohono Awawtam people of the desert, desert people. That's what they always called themselves. So you won't see the term Papago designating them anymore in the future because they find it offensive. They distinguish themselves from their close relatives the Akimult Awawtam, who are also known as Pima, but Akimult Awawtam means river people.

The former Papago are desert people. They also revere the corn and like the Pueblos they know it as mother. In their planting, the Papago made holes in the ground with sharp poles called digging sticks. Indians didn't use plows originally or traditionally. We made sharp short holes with the digging sticks and dropped three or four kernels in the hole. The elder of the family then said something like this to the seeds and to the plants when they come up, speaking in tender and familiar terms: "Here I drop you in the earth and you will come up like a tall feather headdress so my children shall eat and my friends shall eat, too, who come from far away." When the corn was growing the elder said to it: "On Tecolote fields the corn was growing, growing green, growing green, I came, I saw the tassels waving softly in the wind and I whistled softly for joy."

There were songs when the corn was knee-high, songs when the tassels were formed, songs when the ears formed, songs when they were ripe; there were also songs for the beans and the squash. These two crops completed the sacred trinity of basic crops in aboriginal North America: corn, beans, and squash.

If a man chose to hunt, instead of farm, he gave meat to a relative and they in turn raised corn for him. Many people came to the hunter to trade baskets of corn, beans and squash for valuable buckskin and meat. But only a few could afford to have skirts and breech cloth made with the buckskin. Sometimes women made stew in a clay pot with rabbit meat, roots, and corn. Men made cigarettes out of walled tobacco wrapped in the white, thin inner sheath of a corn ear. At council



meetings, each man took four puffs on a cigarette and passed it to the man on his right calling him by the relationship that characterized them, a proper relationship.

Annually, at the end of June or the beginning of July each year, the Papago made a liquor from the fruit of the Sahuaro plant, which grows in abundance in the Sonoran desert. The drinking of it symbolizes for them the earth being filled with water. The four key men who originated this ritual and were the first to drink the Sahuaro cactus wine, seat themselves on mats in the four primary directions, with the rest of the men forming a circle around them. The head man recites a long poem of how the magic liquor produced the white clouds, the rain, and the thick stalk, the broad leaves and the fair tassel of the corn. The liquor is passed around the circle to each of the head men and another speech is made and he responds with a song about rain and clouds.

After the rain ceremony, which was held as the fields were planted, in some villages, there used to be nightly singing to make the plants grow. The people would make images of corn, beans and squash out of carved wood or clay or straw and the men would sit around these images or effigies of the plants singing songs of growth. They often substituted these effigies for the real thing. Now Ruth Underhill has been the most important and discerning student of Papago and there are wonderful, little songs in her book, *Singing for Power*. She has a song poem called "Singing up the Corn," which captures the spirit of what corn means to the Tohono Awawtam nicely. I'd like to read it to you. It's

brief, but I'd like to include the preface she wrote. She says, "As soon as the liquor has been drunk, there comes lightning from the south and then the windstorm carrying the rain on its back. It is late July, the Moon of Rain, the desert arrives with purple thatch and yellow rabbit brush, with the huge moons of white poppies and the flame points of pig star flowers. Now corn planting can begin. Every man has his field at the mouth of a wash where the water comes down after the rains in a swirling red torrent. It floods the lands for half a day until the desert sun has sucked it up and the dead dry soil has sucked it down. Then the ground is soft enough for the Papago to thrust into it a sharp pointed stick which was once his only spade. He stands at the edge of his field holding his digging stick and a buckskin pouch of corn kernels. Kneeling, he makes his hole and says to the seeds in the Papago manner of explaining all acts of nature lest there be misunderstanding. 'Now I put you into the ground, you will grow tall, then they shall eat my children and my friends who come from afar.' Carefully he makes the holes one at each stride and drops in four corn kernel and behind him his wife fills in the holes with her bare toes. Now the corn will come up like a feather headdress, the beans will come singing together but not without help. Night after night, the planter walks around his field singing up the corn. There is a song for corn as high as his knee, for corn that is waist high, and corn with a tassel forming. Sometimes all the men of a village meet together and sing all night. Not only for the corn, but for the beans, the squash, and the wild figs. They make effigies contrived cunningly out of wood and leaves, for the Papago have few

possessions except those provided by nature. Sitting in a circle before their rude imitations of the fruits of the earth, the men sing and this is the song they sing:

Evening is falling.
Pleasantly sounding
Will reverberate
Our songs.

The corn comes up;
It comes up green;
Here upon our fields
White tassels unfold.

The corn comes up;
It comes up green;
Here upon our fields
Green leaves blow in the breeze.

Blue evening falls,
Blue evening falls;
Near by, in every direction
It sets the corn tassels trembling.

The wind smooths well to ground
Yonder, the wind runs
Upon our fields.
The corn leaves tremble.

On the Tecolote fields
The corn is growing green.
I came there, I saw the tassels waving in the
breeze,
And I whistled softly for joy.

Blowing in the wind,
Singing,
Am I crazy corn¹?

Blowing in the wind,
Singing,
Am I laughing corn²?

The night moves singing.
Not sleepy I.
A stick I cut to represent the corn.
Where I find the yellow bees
There will be much corn.

A little yellow cricket
At the roots of the corn
Is hopping about and singing.

A little yellow cricket
At the roots of the squash
Is hopping about and singing.

[Corn speaks:]
The little striped woodpecker
Descends right down into my heart.

[Man speaks:]
This my bow
Twangs in the cornfield.

It moves in different directions,
It moves in different directions,
And then it alights
From the south
On the blue water—
The dragonfly.

It moves in different directions,
It moves in different directions,
And then it stands still
From the south,
On the yellow water—
The dragonfly.

All together all together they sing—
The red beans.
All together, all together they sing—
The white beans.

Am I not the magic tobacco?
Here I come forth and grow tall.
Am I not the magic tobacco?
The blue hummingbird finds my magic flowers.
Above them softly he is humming.

At last they sing the harvest song, as the corn with many colors speaks from the harvester's arms.

Truly most comfortably you embrace me:
I am the blue corn.
Truly most comfortably you embrace me:
I am the red corn.³

I wanted to touch down on that kind of detail just to give a sense of how lovingly the people who depend on corn regard it and care for it—at least as lovingly as Plains people took care of the buffalo. Let me summarize briefly what I have left.

An example of corn as transformer is a Lakota story about a couple who asked for a blessing and thought they were not heard. But the next day, a plant appeared outside their door. Day after day, they watched the plant and it grew and grew and seemed to form arms some-

1 Corn with kernels of two different colors is called crazy corn.

2 Corn with three different colors is laughing corn.

3. Ruth Underhill. *Singing for Power*. Berkeley: U of CA Press.

what like a human, but they didn't understand what it was. When it grew up, it had a yellow tassel; it was the corn plant. It was not the blessing they sought but it was what transformed their culture from one state to another. Corn was the agent of the transformation.

It surprised me to find this story among the Lakota people, who for nearly two hundred years were buffalo hunters on the plains. They still have an ancient memory of how they once grew corn, too, before they fanned out onto the plains, after the acquisition of the horse and the gun. But they still have this ancient story, this ancient memory in the 1980s, of how corn came to them and transformed their culture sometime in the past. So that is one quick, limited example of corn as transformer. They didn't keep it as the blessing it was. The people who were living in settled communities along river courses just used it as an agent to effect a fundamental change in their communities. It survives in that sense till the present time.

From the southwest to the east, the Cherokee, the Chickasaw, Creek, the Choctaw, the Delaware, and here in the land of the Six Nations all celebrate corn. I will just alight on the Delaware or Leni-Lenapi, most of whom now live in Oklahoma. They had a corn harvest thanksgiving ceremony that conveys a brooding sense that once upon a time, corn mother went away and they instituted this corn harvest thanksgiving ceremony to entice her back. So, she said that she would forgive them and remain with them if they had this ceremony every year. Since that time, until recent history, they have had a thanksgiving ceremony so that corn mother would not go away again.

They also had what they called a Delaware doll dance. They had a sense that sometime in the past, corn was offended because children were playing with the uneaten parts of corn, using it in frivolous ways. The parents of the children who were playing frivolously with the corn have to present this doll dance. It is named for the little effigy dolls of the corn that are made and kept within families and for a long time these dolls are descended within particular families of the children that long ago offended the corn. These families are responsible for performing or sponsoring this dance as long as these dolls are in their possession. Some have had them buried with them on their death, others have passed them on to family members that they know care enough to perpetuate the dance. But those are two curious ceremonies. I mention them because they seem to have an ambivalent relationship. On the one hand, corn once left them and she had to be enticed back; on the other hand, corn was offended by her children and they had to be careful. So they seemed to have a somewhat ambivalent relationship with corn for reasons I don't understand. There are a variety of cultural responses to having corn.

Now we come right to where we are, in the country of the Six Nations, the only peoples for whom there has been a monograph by one of their own people, the 19th century, early 20th century anthropologist, Arthur C. Parker. [*Iroquois Uses of Maize and Other Food Plants*. New York State Museum Education Department Bulletin 1910. Reprinted by Irocrafts, Oshweken, Ontario, 1983.] The Iroquois are the only people who have had an entire monograph on their uses of corn and other plants. It is a 130 page monograph, though I noted that just over six pages are devoted to ceremonial and other expressive meanings of corn. So it doesn't say much about how corn is celebrated in stories, song, legend, and ceremony. But reading elsewhere in Parker's monograph, and later studies you have a great number of ritual uses and ritual meanings of corn from the cornhusk curing society and others.

There are a few more stories that I'd like to tell. Let me read to you a few pages from what Arthur C. Parker has on the Iroquois uses of maize in the monograph and I quote, "In the cosmologic myths of the Senecas corn is said to have sprung from the breast of the Earth-Mother who died upon delivering the twins, Good Minded and Evil Minded. Thus the food of the mother's bosom still continued to give life to her offspring. Esquire Johnson, an old Seneca chief, in an interview with Mrs. Asher Wright, the missionary, in 1876, said that the beans, squashes, potatoes and tobacco plants sprang also from the grave. Some of the writer's informants declare that the squash grew from the grave earth directly over the Earth-Mother's navel, the beans from her feet and the tobacco plant from her head.

Parker observes that the mythology of the Iroquois is filled with allusions to the cultivation and uses of corn. The story of its creation from the breast of the mother of the twin spirits is generally accepted as the proper version.

There are other stories, however, that are regarded as simply "Gaga"—for amusement, tales rather than religious explanations. One story relates that an orphan nephew who had been adopted by an eccentric uncle with strange habits thought that he could find out how his uncle obtained food. He pretended to be asleep and looking through a peep hole in a skin coverlet, found that the old man had a strange lot of nuts fastened on a stick (a corn cob). Cautiously removing the nut (a kernel), he dumped it in a strange pot of water and making some mysterious passes over it, as he crooned a mysterious song, he caused the vessel to expand to a great size and fill with delicious food.

The next day the old man went on a journey to a distant gorge and the young man determined to try the experiment he had seen his uncle perform. He shelled all the corn from the cob, threw it in the pot, sang and motioned until the pot swelled up so large that it filled the house and burst the walls. When the old man

returned, he cried out in dismay, "You have killed me." He said he was the custodian of the corn, which was the only ear in the country, the remainder being in the company of a ferocious band of women who killed by their very glances. Beasts and serpents guarded the path to their houses and since there was nothing left to eat, the nephew and the uncle must starve. The nephew laughed and set out to conquer all the difficulties. The story of his conquest of all these things is detailed and exciting. He chased the women up a tree and made them promise to deliver up the corn. They did and the hero went home stepping disdainfully over the carcasses of the beasts and serpents. Since then, corn has been plentiful.

And there is another story, a young man lived on a small hill. Being lonely, he desired to marry a faithful agreeable mate. With his long flowing robes and tasseled plumes, he lifted up his voice and sang: "Say it, say it, someone I will marry." He kept this up day after day and at last there came a fair maiden arrayed in the flowing green mantle over which were beautiful little yellow bells. "I have come to marry you," she smiled. But the tall young warrior responded, "You are not the one, you wander too much from home and you run over the ground so fast that I cannot keep you by my side." The poor rejected pumpkin maiden went sorrowfully away and floating after her came the echo of a song, "someone I will marry."

One morning, a tall slender maiden appeared, drawn toward the singer by the magic of the song. The maiden was covered by clusters of flowers and gracefully dangling leaves. The young man needed only to look and there was an instant consciousness of affinity. The two embraced each other and today in the Indians' corn field, the two plants are inseparable. The cornstalk being twines around her lover. This is how originally the corn and the bean plant came to be together.

There is also a story about Handsome Lake himself, the Seneca prophet of the early 1800s. Once wandering into a cornfield, he felt arms around him and he wondered who was embracing him. The being told him, "When you go to the world above this one, we shall come with you." He looked around to see who was speaking to him and he saw what was embracing him was a corn plant and that it was the spirit of the corn that was in effect talking to him.

These are the four ways that I can discern, from a wide range of reading, that Indian people have perceived and used their traditions related to corn. They have seen it like the Papago and the Pueblo as mother, like Taramara and Navajo people as healer, and the Lakota as culture transformer. We scholars, especially archeologists, know corn only as enabler, for it enables a different kind of culture to arise. Or it enables cultural achievement, which would not be possible without its presence. Corn is an enabler for things to happen. •

"In the cosmologic myths of the Senecas corn is said to have sprung from the breast of the Earth-Mother who died upon delivering the twins, Good Minded and Evil Minded. Thus the food of the mother's bosom still continued to give life to her offspring."

Semantic Roots of Iroquoian Corn

Ne Tionⁿnhéhkwenⁿ

Roy Wright

The plant crop we Americans and Canadians call corn has been the grain *par excellence* of the western hemisphere since time immemorial, and has even supplanted wheat, barley, rye, oats and rice as the chief food grain, not to mention animal fodder, in much of the old world, including parts of Britain. Yet despite the agricultural change reflected in our peculiarly North American use of the word corn, the British continue the older use of *corn* for "grain" in general or "wheat" (the former champion of cereals) in particular, and commonly use *maize* or *Indian corn* for what specialists everywhere call *Zea mays* in scientific Latin or *maize* in English. However, as with other Americanisms, *corn* has been spreading throughout the English-speaking world, especially since the appearance of Corn Flakes.

The current variety of English names for *Zea mays* is nothing new, however; in order of their first appearance, the following have been used:

maize	1555-1887	M 055c, I 205c ¹
Turkish corn	1578	I 205c
Indian wheat	1578-1777	I 205c, T 482a
Turkey corn	1597-1865	T 480b, 482a
Guinea wheat	1598-1613	T 482a
Turkey wheat	1598-1883	T 482a
corn	1608-1891	C 995b
Indian corn	1621-1883	I 206a
Turkish wheat	1670-1894	T 482c

Note that four of the names were rendered exotic by reference to Turkey (like the t. gobbler), and one by reference to Guinea (like the g. hen and the g. pig), thus using popular foreign epithets without any real claim of Turkish or African origin. (Compare "It's Greek to me", or "He's off in Timbuktoo".) *Indian* today connotes 'of the [North American] Indians', but originally referred to India, as in French *bled d'Inde* 'corn' (literally 'wheat of India'; the usual term in Canada) and *dinde* 'turkey [species and hen]' (whence *dindon* 'turkey cock') from earlier *coq d'Inde* 'cock of India'.

The basic English word "corn" is attested since the year 700 (OED) in its broad original meaning of a fine particle or grain, including a cereal seed; cf. *barleycorn* and *corn snow*. Clearly, its extension and subsequent

shift of meaning in North America was due to European contact with maize, whose name first appears in Latinized form *maizium* in 1555, borrowed from 16th-century Spanish *mahiz* or *mayz* (today *maíz*), in turn from the Taino (Cuban Arawak) *maísi* (written *mahici*).² Spanish *zara* is from Quechua, *pace* Spitzer (1912.124n).

Further research is necessary to uncover the inherent meaning of the closest living cognate to now-extinct Taino *maísi*, namely Arawak (Lokono Dian) *marisi* [*marí/i*] (Pet 1987.325), related to *isi* 'seed' by de Goeje (1928.153 [116b1], 230 [119,122]), but perhaps borrowed from some other Indian language in which the whole word has meaning. This *a priori* possibility of borrowing is now supported by W. Pet's observation (personal communication) that the termination *isi* is the common noun 'head, tip' (de Goeje 1928.217 [14], Pet 1987.301), and that the petrified phrase would be a usual Arawak way of assimilating a foreign root, i.e., that there would be no difficulty with my conjectured borrowing of **mari*- 'staple food' from a cognate of Tupi/Guarani *man(d)i*- 'manioc, cassava,' the staple food plant in the

1 The dates of attestation and references

(letter/page/column[a-c]), are from the first edition with supplement (1933) of the OED (Oxford English Dictionary) and its more recent Supplements. The 2nd edition (1989) was not yet available.

2 Note that **boldface** type is used for words or sounds which are systematically transcribed, whether **phonetically** (in phones, with square brackets [] indicating narrower transcription, i.e. greater (sub-phonemic) phonetic detail), **taxonomically** (in phonemes = minimally distinct sound units) or **morphologically** (in systematic phonemes or morphophonemes, basic units for predicting all related forms, cited with + and - morpheme boundaries and in diagonals //). *Italics* are used for any emphasized word, but particularly one cited in its original (non-phonemic) spelling. The International Phonetic Alphabet is used, i.e. / for the *sh* in *ship*, but the following symbols have special meanings here: *c*, *ç*, and *dj* are the affricates spelled *ts*, *(t)ch*, and *(d)j*/*(d)g* respectively in *hats/tsetse*, *itch/church*, and *adjust/judge/age*; *eⁿ* and *oⁿ* are nasal vowels, pronounced like French *fin* and *son* except that Mohawk and Oneida have the vowels [æⁿ, uⁿ] of English *fun* and *soon* (without the final *n*, but with a nasal twang), and Onondaga has [eⁿ] but [uⁿ].

Orinoco homeland of the Proto-Arawakans. Manioc has its own Arawak name *khali* (Pet 1987:312); the Taino called it *kasávi çaçabi* (whence English *cassava*). Carib **ki/ere* (de Goeje 1928:205 [170c], 230 [120]) might be related (genetically or by borrowing) to a putative Arawakan **khasali* (or **khasawi*; the ground is not yet broken by Noble 1965). This becomes more interesting in light of Lounsbury's 1949 evidence for a distant but deep relationship between Iroquoian and Carib.

As a surer example of such deep meaning analysis, we can reconstruct a proto-Germanic root **kurn-* 'grain, cereal; a grain, particle' from the Germanic (Gmc) relatives of Old English *korn* *corn* (Dutch *koorn*, etc., from Gmc **kurnam* [kórna]) and its derivative *kyrnl* *cyrnel* (from Gmc **kurnilam* [k'yrnila]). If we now compare Gmc **kurnam* [kórna] with its contemporary equivalents, e.g. proto-Slavic **zrnó* and Latin *grānum* *granum* (whose plural *grana* became a proto-Romance feminine, ancestor of French *graine*, which English borrowed as *grain* 'morcel' by 1290 [OED]), we can reconstruct Indo-European **gr̥nóm*, the neuter substantive of an old (passive) participle in **-nó-* of the root **gr̥n-*, "to rub (pulverize/thresh?)," hence originally a mote or cereal seed, as still in English *grain*, *kernel*, and (in idioms) *corn*; a similar semantic source might be sought for Iroquoian **oné^hha7*.

Preliminary analysis, reported below, shows that the Iroquoian words for corn refer either to the 'kernel/seed' **oné^hha7*, as in English, or to the 'tassel/flower' **oci7cia7*, both as part-for-whole names. But beside these prosaic descriptive names for corn, the Iroquoians had another, functional name, which could

also refer to its sisters beans and squash: *ne tioⁿnhéhkweⁿ* 'the life-support.' In fact, not just the life, but the prosperity and power of the Iroquoian people is supported by the three sisters, as they are also called.

Corn, Beans, and Squash among the Iroquois

The life-supporting vegetable sisterhood which included corn as its primary member was described in Mohawk by a derivative of the verb root *+oⁿnhe* 'to live': *ne tioⁿnhéhkweⁿ* '(the) life support,' literally /*ne/* 'that' (the [thing]) /*oⁿt-wa+oⁿnhe-hk^w-eⁿ* 'it [which] has caused it to live' (there - it + live - cause - has ..d).

The two other sisters have good Iroquoian names, e.g. Mohawk *osahè;ta7* 'bean(s)' and *onoⁿ7óⁿsera7* 'cucurbit, esp. squash.' Iroquoian words for beans, all from the root *+sahe7*, have been attested ever since *sahe* appeared in Cartier's 1534-6 vocabularies of the earliest attested Iroquoian language, appropriately named *Laurentian* (after their St. Lawrence River homeland) by Lounsbury (1961), and perhaps spoken in two varieties, Stadaconan and Hochelagan (Trigger 1966:203, Lounsbury 1978). Cartier first heard the first dialect in 1534 at the Stadaconan fishing settlement (*o*)*hoⁿkehto* [*hoⁿgehdo*] *Honguedo*; nearby Gaspé rock looks like [*ehoⁿgehro*] *hehonguesto* '[one's] nose'. Before *t*, postvocalic *s* can be *h* as here, or vowel length as in Cartier's *basteau*, from Old English *ba:t* *bát* 'boat,' or even occasionally *s*; before *d*, *s* would not be written, even after long *e*. From there he took the chief's two sons away to France as proof that he had reached the New World; on his second voyage, 1535-6, he heard both dialects at the principal fortified villages of

Table 1. -ci7ci(a)-

language	phonetic/written form	underlying morphological structure (wa-o+)	meaning
Laurentian	ozi7zi ozisy, osizy, osizi	si7si[-a7]	corn
Huron	otsi7tsa7 otsitsa	ci7ci-a7	flower
Onondaga	odji7dja7	çi7çi-a7	flower; cider; hops
Mohawk	odji;dja7	çi7çi-a7	flower; wine
Kahnawa'keha'	odzi;dza7	ci7ci-a7	flower; wine
Seneca	odzi7dzo:t	ci7ci-ot	corn tassel
Tuscarora	udji7djihste	çi7çi-hsn-e	flower
Cherokee	udji:djadá ⁿ	çi:ç-at-a	corn tassel

Stadacona (Quebec City; I etymologize +cteⁿr-a7-kona7 [(o)staⁿra7kona7] 'great cliff,' with a one-flap r heard as a d) and *Hochelaga* (Montreal; +hsr-a7-ke [oh/ela7ge] 'at the beaver dam,' with l for r perhaps reflecting the dialect of the town, just as a foreign visitor might write *New Yawk*). After spending the winter near Stadacona, he abducted its chief and nine others, including one girl from the upriver village of Achelacy, where they may have spoken the Hochelagan dialect; all ten eventually died in France while his third voyage was delayed (Hoffman 1961).

It has been proposed that the vocabularies were not recorded by Cartier, but by Rabelais from the captives in France (Barbeau 1961), but this is contradicted by the variation in writing a given word, the variants supposedly reflecting dialect mixture, and especially by the agreement with forms from Cartier's very un-Rabelaisian travel journals; authorship should be determinable by statistical comparison of the stylistic and linguistic characteristics of the journals with Rabelais' characteristics (Wright, t.a.).

Although the word for squash is not attested in these first Iroquoian vocabularies, 'cucurbit (viz. cucumber and melon) seeds' are recorded there as +kahk^woⁿt-a7 [kahk^woⁿda7]casconda /casconda (cf. [Chaumonot], *Dict. huron*.116v oiahkweⁿta7 oiaⁿk8enta . "Pois [peas])," and "corn" is represented in the manuscript vocabulary of the first voyage by kagaige (Biggar 1924.63; misprinted kapaige by Ramusio; unidentifiable) and in the text and vocabulary of the manuscript *Récit* of the second voyage (printed 1545) by ozisy, osizy (reprinted by Hakluyt as osizi; see the following discussion).

Iroquoian Corn Words

The extinct Laurentian language recorded by Cartier constitutes by itself the first of five groups into which the Iroquoian languages have been divided (Map 1, from Wright 1978). The other language groups are: 2. Huron-Wyandot, 3. Five Nations (Onondaga, Oneida, Mohawk, Cayuga, Seneca), 4. Tuscarora, and 5. Cherokee (see also Chafe 1976, Mithun 1979 for details). Forms will be cited in this order.

Corn as a species is designated by the following Iroquoian roots: +ci7ci 'flower, bloom, tassel' (Table 1) and +neⁿh 'seed, kernel' (Table 2).

The +ci7ci root probably meant "flower" and it may perhaps be seen in the originally Arawakan Spanish word *chicha* "corn beer," whose form and meaning bridge the gap between "flower," which it resembles formally, "corn," which it resembles semantically, and "wine," which it resembles formally and semantically (fermented beverage).

The +neⁿh root is the generic "seed" root, appearing with simple noun affixes alone in Huron and Seneca, or extended by a meaningless but distinctive clement, -st-, in Mohawk. A more archaic noun type ká:neⁿ, formed from the same +neⁿh root with the neuter agent prefix ka-, denotes a different class of seeds.

In conclusion, the ethnobotany and ethnoagronomy of the Iroquois and their Iroquoian relatives, as well of other Indian groups as far away as Bolivia, would benefit from etymological research into linguistic history, of which this has been a sample, and subsequent ethnohistoric-linguistic reconstruction of the language (forms) and cognitive culture (meanings) of the Proto-Iroquoians in this rich semantic field. •

Table 2a. -neⁿh-

language	form	structure (wa-o+)	meaning
Laurentian	--		
Huron	one ⁿ ha7 onen ⁿ ha	ne ⁿ h-a7	corn
Onondaga	oné ⁿ ha7	ne ⁿ h-a7	corn
Mohawk	oné ⁿ ha7	ne ⁿ h-a7	seed
Seneca	oné ⁿ o ⁿ 7	ne ⁿ h-a7	corn
Tuscarora	uné ⁿ he	ne ⁿ h-e	corn
Cherokee	--		

Table 2b. -neⁿh.st-

language	form	structure (wa-o+)	meaning
Laurentian	onesta ⁷ honnesta	neh-st-a ⁷ [?]	plums, apples
Huron	one ⁿ sta ⁷	ne ⁿ h-st-a ⁷	seed, semen
Old Onondaga	one ⁿ /ta ⁷	ne ⁿ h-st-a ⁷	seed
Mohawk	ó:ne ⁿ hste ⁷	ne ⁿ h-st-7	corn
Tuscarora	uné ⁿ hsne	ne ⁿ h-st-e	seed
Cherokee	--		

Corn Power: The First American Revolution

Given the means, will people grow as much food as they can, or only as much as they need (see Arturo Warman, this issue)? Will increased food production dictate population growth, or vice versa? Given a high-yield crop like corn, surpluses will fuel population growth, economic abundance, and eventual political power. This was the course of the first North American revolution, a revolution based on agricultural and economic issues, not (as far as we know) on more recent ideas of political liberty and power, as with the Iroquois League and the American republics. Corn gave an American flavor to this agricultural revolution, for corn changed speculative answers to these questions into empirical reality. When 8th-century Mexican farmers realized that corn productivity allowed them to test these questions in the social laboratory, they did so, and found that what they needed in an average year would not get them through a bad year. So they grew what they could, storing the surplus for trade or alleviation of famine.

The implications for Iroquois history are not hard to find. Not only were the Senecas supplying the other Iroquois nations, as John Mohawk proposes (this issue), they were also storing up grain for their own lean years, and for trade when sufficient stockpiles were achieved. This best explains, I feel, the enormous stores found when the Seneca country was invaded by Denonville in 1687 and Sullivan in 1779.

Not only in the Northeast, but throughout its range in the pre-Columbian New World, corn gave economic power and freedom from uncertainty of subsistence, more than any other food crop. The revolution took place gradually, as the modern varieties were developed out of the less-productive earlier varieties of Zea mays, itself a spontaneous mutant of inedible Teocinte.

The American agricultural revolution, like the political one of 1776, yielded the means (economic power and ensuing political freedom) necessary for rapid demographic expansion. In the first case, corn agriculture was the primary basis of economic and political power; seizure of Indian lands provided the primary means for such power in the second.

- R.W.



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She rubbed her hand along the side of her body, and dried corn poured out to fill the basket. Now the boy grew afraid.

The Coming of Corn

The following chapter is excerpted from KEEPERS OF THE EARTH: Native American Stories and Environmental Activities for Children, by Michael Caduto and Joseph Bruchac. ISBN 1-55591-027-0, \$18.95. Published by Fulcrum, Inc., 350 Indiana Street, Suite 510, Golden, CO 80401. 800-992-2908. This volume represents an exciting new approach to teaching Native American stories and the environment. See review in Winter 1988 issue of NEIQ.

Long ago, when the world was new, an old woman lived with her grandson in the shadow of the big mountain. They lived happily together until the boy was seven years old. Then his Grandmother gave him his first bow and arrow. He went out to hunt for game and brought back a small bird.

"Ah," said the Grandmother, "You are going to be a great hunter. We must have a feast." She went out to the small storehouse behind their cabin. She came back with dried corn in her basket and made a fine-tasting soup with the small bird and the corn.

From that point on the boy hunted. Each day he brought back something and each day the Grandmother took some corn from the storage house to make soup. One day, though, the boy peeked into the storehouse. It was empty! But that evening, when he returned with game to cook, she went out again and brought back a basket filled with dry corn.

"This is strange," the boy thought to himself. "I must find out what is happening."

The next day, when he brought back his game, he waited until his Grandmother had gone out for her basket of corn and followed her. He watched her go into the storehouse with the empty basket. She rubbed her hand along the side of her body, and dried corn poured out to fill the basket. Now the boy grew afraid. Perhaps she was a witch! He crept back to the house to wait. When his Grandmother returned, though, she saw the look on his face.

"Grandson," she said, "you followed me to the shed and saw what I did there."

"Yes, Grandmother," the boy answered.

The woman shook her head sadly. "Grandson," she said, "then I must get ready to leave you. Now that you know my secret I can no longer live with you as I did before. Before the sun rises tomorrow I shall be dead. You must do as I tell you, and you will be able to feed yourself and the people when I have gone."

The old woman looked very weary and the boy started to move toward her, but she motioned him away. "You cannot help now, Grandson. Simply do as I tell you. When I have died, clear away a patch of ground on the south side of our lodge, that place where the sun shines longest and brightest. The earth there must be made completely bare. Drag my body over that ground seven times and then bury me in that earth. Keep the ground clear. If you do as I say, you shall see me again and you will be able to feed the people." Then the old woman grew silent and closed her eyes. Before the morning came, she was dead.

Her grandson did as he was told. He cleared away the space at the south side of the cabin. It was hard work, for there were trees and tangled vines, but at last the earth was bare. He dragged his Grandmother's body, and wherever a drop of her blood fell a small plant grew up. He kept the ground clear of small plants, and as they grew taller it seemed he could hear his Grandmother's voice whispering in the leaves. Time passed and the plants grew very tall, as tall as a person, and the long tassels at the top of each plant reminded the boy of his Grandmother's long hair. At last, ears of corn formed on each plant and his Grandmother's promise had come true. Now, though she had gone from the Earth as she had once been, she would be with the people forever as the corn plant, to feed them.

Grandmother brings both joy and sadness in this story. She is giving in every way. In life she gives the boy the bow and arrow to hunt with and the corn to eat. When the boy discovers her secret, Grandmother dies and gives her greatest gift: corn to feed the people through the generations. But the boy has to help the corn to grow. The land has to be cleared to prepare for the "seeds," his Grandmother's blood. Then he has to keep the earth clear around the small plants and care for them.

Discussion

The images in this story are symbolic. The relationship between the Grandmother and the Boy can be seen as a metaphor for the relationship between the planter and the crop; through personal sacrifice and work, the planter sows the seeds that bring forth new plant life to feed the people.

No matter how food crops have changed over the thousands of years that people have grown them, they were all first cultivated from native plants in the wild. Many of the most important food plants used world wide today are native to North America. (See Chapter 4, pages 27-28 for more information on native food plants.)

Farming these crops requires knowledge of the plants' needs: soil, rain, warmth and sunlight. The soil must be prepared and cared for. Farmers use different approaches for growing crops. One common distinction is between "chemical" and "organic" methods of fertilizing the plants and controlling insect damage and other crop losses. The last activity in the chapter studies different methods of fertilizing the soil and the relationship between these methods and the nutrient cycle.

Soil is a key in the giving and receiving cycle between the planter and crop: it is the fertile bed from which new life springs time and again.¹ However, the soil is not an infinite source of new life that can give, give and then give some more. Soil is part of a circle. It, too, must receive to keep giving.

The dead plants and animals, called *detritus*, return to the soil to feed it. Fresh plant and animal remains are eaten by insects, mites, worms and many other organisms, who break these remains down mechanically and leave them partially decomposed as excrement. These remains are consumed by the *decomposers*: chiefly bacteria and fungi, which break them down further into proteins, fats, carbohydrates, ash and other compounds. Nutrients are released for plant growth through leaching from detritus, excretion and on death of the decomposers, in a process call *mineralization*.

This process, called *decomposition*, is vital to the *nutrient cycle*, which is one of the essential circles of life on Earth—the circle of the life and death. (See Chapter 22 for more about life and death.) It is this important event in the thin skin of topsoil on Earth that makes continuing life possible for the plants that use the sunlight to grow and the animals who eat them. (See Chapter 7 for information and activities about the sun as the source of energy for plants and animals.)

Editor's Note: This chapter is excerpted in its entirety from Keepers of the Earth: Native American Stories and Environmental Activities for Children. by Michael Caduto and Joseph Bruchac. ISBN 1-55591-027-0, \$18.95. Published by Fulcrum Inc., 350 Indiana Street, Suite 510, Golden, CO 80401. 800-992-2908.

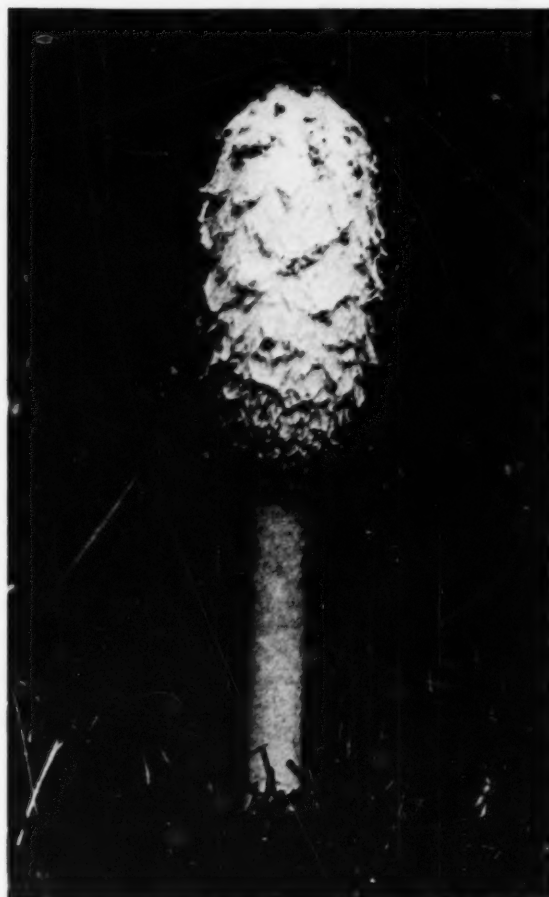


Figure 16-1. Fungi, such as this mushroom called the shaggy mane, are important decomposers of dead plant and animal remains.

Questions

1. How do you feel when Grandmother has to die in the story? What are the gifts she gives while alive? When she dies?
2. The boy has to prepare the soil and care for the young corn plants. When we grow food, what are the steps we need to take to grow and care for the seeds and plants?
3. Where do our food plants come from: corn, beans, apples, squash, rice, wheat, potatoes, and others?
4. Can the soil keep giving more food without anything being given back? What does the soil need? How does soil get "fed" to continue the circle of giving and receiving?
5. What are some different kinds of farming practices, and how do they work to keep the soil fed to grow food crops for the future?

Activities

The Planter, the Crop and the Soil

Activity: Establish and cultivate a vegetable garden to grow some favorite vegetables. Grow these crops, from seed through harvest, and then preserve them. Give special attention to caring for the soil and plants.

Goals: Realize where food comes from. Understand the balance between the planter and the crop, and the need to give labor and nutrients to the soil in order to keep receiving food. Learn the basics of soil care and vegetable gardening.

Age: Younger Children and Older Children

Procedure: Establish and fence off a garden space in your yard or on the learning center grounds. If this is not possible, you can grow a garden in window boxes or in rooftop planters. Be sure that the soil in the planter is well-drained by layering it over several inches of sand. Prepare the seed bed ahead of time by tilling the soil and adding fertilizer in the form of manure or compost. Do this during the fall season before planting, if possible, to allow the manure to begin decomposing so it will most benefit the young plants. Add some lime if the soil is too acid. The local branches of the governmental Soil Conservation Service or Department of Agriculture will often provide free soil testing for pH levels and nutritional balance.

Make a list of your children's favorite vegetables and fruits, and narrow these down to around ten or so different kinds that are most popular. Do not neglect perennials such as asparagus and blackberries, which can be enjoyed for years to come. Keep in mind that constant weeding and long-term care are required for perennials.

Be sure the chosen food crops will grow under the

conditions at hand (light levels, soil type, temperature, length of growing season, etc.). Some crops, for instance, need much longer growing seasons than others. Lima beans and melons are harder to grow to maturity in Canada and in the northern extremes of the United States because the growing season is so short.

The seeds of some crops, such as peas, can be planted directly in the spring garden as soon as the soil has dried out enough to be worked. Other crops, like tomatoes and peppers, are best when started as seeds in flats and transplanted into the garden beds when the seedlings are several inches tall. You will need to start them in cold frame or indoors, so be sure to expose them gradually to the outdoor climate to prevent shock when they are transplanted. Do this by putting the seedlings outside for short periods of time each day at first. Then gradually increase the length of the exposure time as field planting approaches.

Throughout this experience, have the children keep close track of weather and care for the plants accordingly, such as watering plants during dry periods and covering them during early frosts. (See Chapter 9 about wind and weather.) Set up a schedule where children will keep the plants watered, weeded, pruned, well fed and free of pests. Vigorous plants that are well cared for and provided with balanced nutrition will have fewer problems with diseases as well as other pests because the plants' natural resistance will be high. With intensive growing like this, you can remove by hand any pests that do appear. This is also a good means for learning about insect life cycles. The idea is to experience growing food, not to produce crops for commercial market, so you can afford a few blemishes on the vegetables and lower yields due to the fact that this is a learning experience.

... It is important to conduct the gardening lesson as a natural, nurturing and expanding experience. Have the children occasionally place manure or other fertilizer along the sides of the rows of crops to feed the plants. Emphasize that in doing this the children are giving back to the soil.

Harvest the crops, then clean, process and freeze the vegetables and fruits. Turn the unused portions of the plants back into the soil or haul them to a compost heap. Then lightly spread manure and plant a winter cover crop, such as winter rye, to protect the soil when it is exposed during the cold months.

Materials: Paper, pencils, garden space, shovels, hoes, rakes, spades, seeds for food crops, seed flats, cold frame, source of water, watering cans or hose, fertilizer (manure or compost), fencing and fence posts to keep animals from eating seeds, fence staples, hammer, mulch to cover and protect soil, seeds for cover crops (such as winter rye) when the soil is fallow (unprotected by the food crop), weather reports, gardening reference books, agricultural lime (if needed), window boxes or



Figure 16-2. Sowing peas during the early growing season

planters, soil, sand, freezer, knives and other necessary equipment for processing crops, freezer bags.

Nutrient Cyclers

Activity: (A) Visit a woodlot and study decomposition and the plants and animals that are causing things to decay. Collect decaying leaves and create a bulletin board display of the nutrient cycle. (B) Play a game that "cycles" nutrients among the players in the "nutrient cycler."

Goals: Understand that nutrients are used for plant growth. Understand that when plants and animals die, they are decomposed by the soil organisms and nutrients are thus released for further plant growth. Be familiar with the meaning of nutrient cycle and the plants and animals involved in the process of decomposition.

Age: Younger Children and Older Children

Procedure A: *Recycling the Forest Floor.* Take a trip out to a wooded area. Any grove of trees is fine as long as there are leaves decaying in the soil. Walk into the

woodlot with the children and then suddenly say, "Look, soil is forming all over. Come quick and see!"

"Look," you say, "all of these leaves are turning into soil. Can you see it happening?" Have the children use the hand lenses to look closely at the leaves as they gently peel layers off the top of the soil. The farther down they go, the more decomposed the leaves will be.

Have the children explore what is causing the leaves to turn from leaves into soil. Help them to discover the white threads of fungi, which are one of the few living things that can break down cellulose in wood and leaves. There will be worms, mites, many kinds of larvae, spiders, centipedes and millipedes and many more. Refer to these organisms as you describe the process of *decomposition* (see "Discussion" section). Then with the children, collect some leaves in various stages of decomposition.

Younger children will create a "Nutrient Cycler" bulletin board or mural by making, out of construction paper, a large circle with an arrow pointing in one direction. Have them place the leaves in sequence onto part of the circle, with the arrow pointing from whole leaves to those that are the most decomposed. The children will draw pictures of the soil organisms they found and put these pictures on the mural, indicating that the organisms are eating the leaves and, in some cases, each other. At the spot on the circle where the leave are thoroughly decomposed, have the children create some plants growing from the newly formed "soil." Further along on the circle, show some of these plants dying and leaves falling from trees and shrubs to start the cycle over again.

Procedure B: *Cycle Circle Game.* Older children will play this game in teams of about six or more. Make name tags out of cardboard that list the cycle circle players (see "Materials") and have the children hang the name tags around their necks.

To start the game, sit the children down in a circle with everyone facing the center, review the nutrient cycle and name the players. State that during the game the "nutrients" will keep getting cycled among the players. To play the game, one player (the nutrient "cycler") will take the "nutrients" (the leaf) and walk around the outside of the circle. At some point this "cycler" will drop the "nutrients" behind a seated player and will then run around the circle. The seated player will pick up the "nutrients", run after the cycler and try to tag him or her. The cycler tries to get back to the spot where that player was seated without getting tagged, then the other player becomes the cycler, keeps the "nutrients" and starts the *Cycle Circle Game* over again.

Materials: (A) hand lenses, wooded area, bags to collect leaves in, wall space or bulletin board, construction paper, crayons, stapler and staples, pencils, scissors, paste, leaves in various stages of decomposition from the field trip. (B) open space for playing the game; make



Figure 16-3. All of these leaves are turning into soil. Can you see it happening?

name tags with names of things that are part of the nutrient cycle: leaf, worm, mite, fungus, bacterium, nematode (small roundworm), centipede, plant roots, beetle, springtail, others you may have found on the field trip.

Farming and the Nutrient Cycle

Activity: Explore farming techniques that rely on chemical fertilizers and those that rely on organic nutrients to enrich the soil. Compare and contrast the benefits and drawbacks of these methods. Use the role-playing experience to examine the relevant issues.

Goals: Understand that there are different ways of providing soil nutrients while farming, and that some of these methods more closely approximate the natural nutrient cycle than others. Understand the distinction between chemical fertilizer and organic fertilizer.

Age: Older Children

Procedure: If possible, visit several farms or gardens where people use different approaches to nutrient cycling. Some farms and gardens recycle nutrients from the land by using manure and plant compost for fertilizers. Others use synthetic chemical fertilizers as a nutrient supply. If taking a field trip is not possible, have the children study these different types of farming from other sources, such as books, magazines, news reports and visits from farmers.

In their reports, the children will compare and contrast the different types of farming and draw conclusions about the ability of the various methods for maintaining soil health and fertility long term. Hold a brainstorming session and list the pros and cons for these different farming methods as related to the nutrient cycle.

Assign roles to the children, allowing them to choose a role that they prefer, if possible, and hold a forum to bring out the issues. The roles could be: agribusiness farmer, "environmental" or "organic" farmer, the soil organisms, crop plants, farmer's family, consumers of the crops, etc. Several children can play the same role. Discuss the issues that arise and try to reach a consensus on the farming method(s) that best support soil health and nutrient cycling in the long run. Explore the ecological, economic and social costs, benefits and trade-offs of the different methods.

Materials: Three or more farms using different farming practices ranging from approaches that are chemical-intensive to "environmental" or "organic" methods, information and pictures about these various methods, references and articles on different kinds of farming, paper, pencils, felt-tipped marking pens and newsprint or chalkboard and chalk.

Extending the Experience

- Make a list of some of our most commonly used modern farm plants and research where they came from and which Native people originally used them. Set up a bulletin board with pictures of modern crops and their predecessors from the wild, as well as the Native people who eat them today and have eaten them in the past.
- Set up a recycling program. Put out collecting containers for glass, aluminum, bimetal cans, paper and organic waste. Compost and return the organic material to the soil via the garden. Collect the other materials and periodically bring them to a recycling station in your area. If you do not have a recycling station nearby, you may want to start one.
- Share a popcorn feast! Popcorn is a gift from Native Americans.



The Corn Spirit

Long ago, near the big river which flows towards the rising sun, there was a village of people who made their living through farming and hunting. Their most important crop was corn. The old people always told them that the Corn Spirit deserved great respect. There were songs of thanksgiving and special ceremonies to honor the corn and thank it for keeping the people alive. It happened that one year all things went well during the growing season. The crows and other birds did not raid the field. The sun shone just enough and the rain fell at just the right times. The spring was not too cold and the summer was not too hot. No one had ever seen such a year. When the harvest time came, there was so much corn that the people began taking it for granted. They wasted more than they ate. They threw whole ears of corn to their dogs. The children played with the corn stalks and trampled them underfoot. Even with all that they wasted, there was still a great deal of corn left. The villagers dried it and placed it in baskets and buried it as they did every other year so they would have corn during the winter. But they made their storage holes carelessly. It was now the time for hunting. They were sure they would have no need for the corn at all until the next growing season. They showed no respect or thanks for their good harvest. All of the people, both old and young, acted this way.

Only one man, whose respect for the corn was so great that he could not imagine wasting it, did not act this way. His name was Dayohagwenda and he was very saddened by the way the others acted but no one paid any attention to him. They were too eager to go hunting. They paid no attention to Dayohagwenda and they left him behind when they set out on the game trails.

This year, though, the hunting season did not go well. Whenever the hunters came close to an animal it caught their scent and ran. Their arrows, even when fired at close range, would strike branches and miss or the strings of the bows would break. The deer and the moose and the elk all were swifter than anyone had ever seen and none of the hunters had any success. Finally, all of the game animals disappeared and none could be found. The hunters came back to the village after many days, all of them empty-handed. They went to the lakes and streams, but the waters were empty of fish. Then they decided to dig up the corn they had stored. It would keep them alive through the winter. When they dug up the stored grain, however, they found that the mice had crept in and eaten all of it. There was no food at all left in the village.

Meanwhile, Dayohagwenda, the man who respected the Corn Spirit, was walking in the forest. He was sad at heart and worried about the way his people acted. He did not know how badly the hunting was going, but he knew that bad things happen to people who forget to be thankful. As he walked he found himself on a trail he had never seen before. It led to a clearing in the forest. There, in the center of the clearing, was a small lodge made of bark on top of a mound of earth. Weeds grew around the lodge and it was almost ready to fall down. A small old man dressed in ragged clothing and covered with dirt sat in front of the lodge weeping.

"Grandfather," said Dayohagwenda, "why are you weeping?"

"I am weeping because my people no longer respect me," the old man said.

"Why are your clothes all torn?"

"They are torn because my people have set their dogs upon me."

"Why are you so dirty, Grandfather?"

"I am dirty because my people have let their children trample on me and throw me into the mud."

"Why is your lodge surrounded by weeds, Grandfather?"

"It is so because my people no longer take care of me. Now it seems I must go away and never come back to them again."

"Grandfather," said the man who respected the Corn Spirit, "I know who you are. I will go back and remind

my people how they must treat you. Perhaps this time they will take care of you and you will be able to return to us."

The small old man stopped weeping and nodded at Dayohagwenda. "Grandson," he said, "your respect is a good thing. I will stay with you. Now you must go back to the village."

Dayohagwenda turned and started back on the path. He looked back over his shoulder to say goodbye to the old man, but the clearing and the lodge and the small old man all were gone.

When Dayohagwenda got back to the village, he discovered that his people were in despair. They did not know how they were going to survive the hard season to come. They had no game to eat and all of their stored corn had been eaten by the mice. Some people were burning tobacco and praying for help. Others were singing the songs of thanksgiving and respect which they had neglected to do before.

"Listen," Dayohagwenda said, "I have been in the forest. There I found a lodge overgrown with weeds and an old man who wore clothes the color of corn husks. He was dirty and his clothes were torn. He said that his people had deserted him and driven him away. I turned to go, but when I looked back he and his lodge had vanished."

The people listened. As Dayohagwenda spoke, they began to understand. The old man was the Corn Spirit and they had driven him away by being wasteful and disrespectful.

"The Corn Spirit will never return to us," the people said. "We will starve."

"No," Dayohagwenda said, "he said he would stay with us. He will help us through the winter."

Then Dayohagwenda went to the place where he had stored the corn from his own fields. He had dug his granary well and stored the corn properly. All of the corn was still there. There was just enough to feed the people of the village through the winter—though no one was able to eat as much as they wanted and the people were thin and hungry by the end of winter.

When spring came, there was just enough corn left over for planting. As the people cared for their fields, doing the old ceremonies and singing their songs of thanksgiving, the game animals began to return and the fish came back to the streams. That fall, when the people of the village harvested their corn, they were careful not to be wasteful and to treat the corn with respect. They remembered the lessons taught them by the Corn Spirit and their children's children remember those lessons to this day.

Retold by Joseph Bruchac and inspired by the Seneca corn stories found in Seneca Fiction, Legends and Myths collected by J.N.B. Hewitt, published in the 32nd Report of the Bureau of American Ethnology, 1910-11.



ACTIVITIES

to Accompany *The CORN SPIRIT*

Carol Cornelius

Within the Haudenosaunee (Iroquois) culture, and many other cultures, stories serve several purposes. Often the old stories are used to explain the natural world—how the earth was created, how stars came to be, why we have mosquitos. Stories also provide guidance for human behavior and some are just entertainment.

"Corn Spirit" is a story to guide human behavior. The following questions may be useful in a classroom discussion.

Discussion Questions:

1. What foods are mentioned in the story?
(Corn, deer, moose, elk, fish)
2. At what time of year does this story take place?
(In the fall)
3. Why were the Senecas storing corn, hunting, and fishing?
(So they would have food for the winter)
4. What was the attitude of the people towards a bountiful harvest?
(They took it for granted, wasted it, threw whole ears to their dogs, trampled the stalks, and did not store it properly.)
5. What did Dayohagwenda do that was different from the others?
(He carefully stored his corn)
6. Why was the Corn Spirit, the old man, weeping?
(Because the people had lost respect for the gift of corn.)
7. What happened to the people because they did not respect the corn?
(They would have starved that winter. Only Dayohagwenda stored corn and saved them from starvation.)
8. What do you think the people will do differently the next season?
(They will take care of the harvest, store it properly and give thanks for a bountiful harvest.)



9. What is the main lesson of this story?
(To be thankful for the harvest, and to properly store food.)
10. Why do Seneca people continue to give a Thanksgiving for their crops?
(These were the original instructions: to be thankful.)

Activities:

Have students draw a circular chart labeling the four seasons. ask them to identify and put on the chart:

- when to plant (spring)
- when to gather wild onions (early spring)
- when to gather wild strawberries (late spring)
- when to pick nuts (late summer, fall)
- when to harvest gardens (late summer, fall)
- when to hunt deer (fall)
- when to fish (spring, summer, fall)

Ask students to compare the food available during the spring, summer, and fall seasons with the winter season. Ask students to compare their chart with the Seneca Corn Spirit story.

Have students draw another circular season chart and label it with foods, game and fish available in their local area.

Students may cut pictures of foods from old magazines and paste them on the chart according to the season in which they are available.



Joel Cadbury and Wally Ransom building a corn crib.
Photo by Kathy John.

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Foods Prepared from Corn



Leaf bread tamales, oniá'tci'dá. This is prepared from green corn. The kernels are cut or scraped from the cob and beaten to a milky paste in a mortar. The corn used for leaf cake tamales should be too hard for green corn good for boiling and eating on the cob. The paste is patted into shape and laid in a strip on one end of a broad corn leaf, the free half being doubled over the paste. Other leaves are folded over the first, the ends all projecting uniformly from one end for tying. The oniaticida was then tied three times laterally and once transversely and dropped into boiling water. When cooked—cooking requires about 45 minutes—the wrappings are removed and the cake is eaten with sunflower or bear oil, though in these modern days bacon grease or butter are more in vogue. Oftentimes cooked beans are mixed with the mass before wrapping in the leaves. These impart their flavor and give variety.

Leaf cakes may be dried for winter's use if no beans have been used with the corn.

Baked green corn, Ogon'sä. When the milk has set, Tuscarora and sweet corn is scraped from the cob and beaten to a paste in a mortar. This should be done just before the evening meal. After the housework is finished the housewife lines a large kettle with basswood leaves three deep. The corn paste is then dumped in up to two thirds the depth of the vessel. The top is smoothed down and covered by three layers of

leaves. Cold ashes to a finger's depth are now thrown over the leaves and smoothed down. A small fire is built under the kettle which hangs suspended from a crane or tripod. Glowing charcoal is placed on the ashes at the top. The small fire is kept brisk and the coals at the top renewed three times. The cook may now retire for the night if her kettle hangs in a shielded place or in a fire pit. In the morning the ashes and top leaves are carefully removed and the baked corn dumped out. The odor of this steaming ogon'sä is most appetizing and it is eaten greedily with grease and butter. For winter's use the caked mass is sliced and dried in the sun all day, taken in at night to prevent dew from spoiling it and dogs or night prowlers from taking too much of it, and set out again in the morning to allow the sun to complete the drying. The ogonsa is then ready to be stored away for the winter. When ready for use the winter's store of ogon'sä was taken from storage and a sufficient quantity for a meal thrown in cold water and immediately put on the stove. Boiling for a little more than a half hour produces a delicious dish.

Boiled green corn, O'kni'staga'n'o. This is simply the green corn on the cob with which we are all familiar. Tuscarora corn as well as sweet corn, however, was used with equal favor. It was eaten on the cob or scraped off and eaten in dishes. Sometimes the kernels were cut from the cob and boiled as a soup.

The Seneca name means delicious corn food, from o'nious'ta, *corn*, and oga'n'o'n, *delicious food*.

Fried green corn, Gagon's'ä ge'd'a. This dish was prepared by scraping the green corn, in the milk, from the cob, mashing it in a mortar and either patting it into cakes or tossing it in a basket to make a loose light mass. The corn was then ready for frying. The older Indians say that the frying could be done in a clay kettle and the corn so prepared was especially good if cooked in bear oil.

Succotash, Ogon'sä'ganon'dä. Iroquois succotash was prepared much as is the modern form. The green corn cut or scraped from the cob was thrown in a pot of beans which had nearly been cooked and the mass cooked together until both ingredients were done. A sufficient quantity of salt and grease or oil was added for seasoning and flavor. The favorite corn for this dish

was Tuscarora or sweet corn.

Baked cob-corn in the husk, Wades 'konduk o'nis'ta.

This was a popular way of preparing green corn on the cob. The ashes from the camp or hearth fire were brushed aside and a row of unhusked ears laid in the hot stones or ground. These were then covered with cold ashes. Embers were now heaped over and a hot fire built and continued until the corn beneath was thought sufficiently baked. Corn baked in this manner has a fine flavor and never becomes scorched.

Baked scraped corn, Ogoⁿ'sä' ohon'st'ä. The green corn is scraped from the cob with a deer's jaw or knife, pounded in a mortar or mashed in a wooden bowl with a stone, patted into cakes, sprinkled with dry meal and baked in small dishes. For baking in the ashes the cakes are wrapped in husk and covered with ashes. Embers are heaped over and a brisk fire built, this being kept going until the cakes were considered baked.

Cracked undried corn, Ojis'tanondä. The ripened but not dry corn was shelled from the cob and smashed kernel by kernel on a flat stone, a muller being used as a crusher. The crushed corn was mixed with new harvested beans and boiled for nearly three hours. Salt was used as a seasoning and deer or bear meat mixed with the mass if desired.

Boiled corn bread, Gagai'teⁿtaⁿ'ä'kwa'. For bread, purple, calico and the two hominy corns were used. After the corn was shelled it was boiled from 15 to 30 minutes in a weak lye made of hard wood ashes and water. The lye solution in order to be of the proper consistency must be strong enough to bite the tongue when tasted. When the hulls and outer skins had been loosened, looking white and swelled, the corn was put in a hulling basket, taken to a brook or large tub, where it was thoroughly rinsed to free the kernels of any trace of lye and to wash off the loosened hulls and skins. The corn was then drained, thrown in a mortar and pulverized with a pestle. The granules were sifted through the meal sieve to make the meal fine and light. After this process the meal was mixed with boiling water and quickly molded into a flattened cake about eight inches in diameter and three inches thick. The cake was then plunged into boiling water and cooked for nearly an hour. The object of mixing the meal with boiling water was to coagulate the starch and make the meal stick together. After the meal is mixed with the hot water and molded, the hands are plunged in cold water and rubbed over the loaf to give it a smooth glossy surface. When the loaf floats it is considered properly cooked. Sometimes the molded loaf is baked instead of boiled, especially for journeys. The loaf is buried in hot ashes and a roaring fire built over it until it is baked



Wedding bread, Goⁿia''ta' oä'kwa. Corn was prepared in the same manner as for bread but was wrapped in two balls with a short connecting neck like handleless dumbbell wrapped in corn husk and tied in the middle. It was then ready for boiling. To complete the cooking required about one hour.

Twenty-four wedding bread cakes were taken by the girl's maternal grandmother (by blood or by clan appointment, if the maternal grandmother was dead) to the door of the maternal grandmother of an eligible male. The recipient, who had previously conferred with the donor, if she favors the alliance suggested by the gift, tastes the bread and notifies her daughter that her (the daughter's) son is desired to unite with a certain young woman in marriage by the grandmother of that young woman. The mother of the boy must submit to her mother's wish if she can offer no substantial objection. The boy's grandmother then makes 24 wedding cakes and carries them to the girl's grandmother who then notifies her daughter that the girl must marry a certain man. If the suit is rejected at the first proposal the wedding cakes are left untouched and the humiliated donor must creep back and reclaim the cakes. My informant says the rejected cakes were never eaten, but probably reserved as ammunition with which to pelt the offending old dowager, who had given reasons to believe that the suit was smiled upon. The bounds of a cake recipe forbid further discussion.

thoroughly. When it is to be eaten the ashes are washed off and slices cut from the loaf. The baked loaf if not wet will not become moldy like boiled bread and this is the approved form for hunting and war parties.

In the course of boiling some of the meal on the outside of the cakes comes off, together with a quantity of starch and gluten, and mixes with the water. When the bread is sufficiently cooked this liquid is poured out in bowls and drunk as tea. The Iroquois considered this gruel a great delicacy.

Corn bread is fairly hard but readily crumbles when masticated. It is not dry, but is moist and mealy. Before eating the cake it is sliced and spread with tallow or butter, bear or deer oil. It is a delicious food and considered highly nutritious. Often cooked cranberry beans or berries were mixed with the meal before boiling. These added to the flavor as well as nourishment.

Early bread, Ganeoⁿte''doⁿ. Before the corn was thoroughly dry in the autumn it was plucked for making early bread. The unhulled corn was mixed with a little water in a mortar and beaten to a paste instead of a meal. Loaves were molded by the hands from the paste and boiled. This bread was considered a great delicacy and valued as a food for invalids.

Early corn pudding, Ganeoⁿte''doⁿ odjis'kwa. The paste from the mortar, as described above, was sometimes drained, sifted and tossed into a wet meal. It was then thrown in boiling water and boiled down to a pudding.

Dumplings, Ohoⁿ'sta'. Moisten a mass of corn meal with boiling water and quickly mold it into cakes in the closed hand moistened in cold water. Drop the dumplings one by one into boiling water and boil for a half hour.

Dumplings were the favorite thing to cook with boiling meats, especially game birds.

To fish the dumplings from the pot, every one had a sharpened stick of bone.

Hominy, Onon'däät. Hominy is prepared from flint corns. For a family of five persons, a quart of corn was thrown in a mortar and moistened with a ladleful (four tablespoonfuls) of water. To make the pounding easier a teaspoonful of white ashes or soda is thrown in also. The pounding with the pestle proceeds slowly at first to loosen the hulls, this work being accelerated if ashes have been used. When the hulls begin to come off easily the pounding is quickened until the corn is broken up into coarse pieces. It is then ready for the first sifting, eⁿyowoⁿ'k'. A basket called a onius'tawanes is used for this purpose. The hominy passes through and is placed in a bowl while the uncracked corn is thrown back into the mortar to be repounded. After the second sifting the uncracked kernels that remain are thrown out to the birds or chickens. The hominy is then ready for winnowing. The results of the two poundings are carefully mixed and then put in a tossing bowl or basket. The hominy is tossed with a peculiar motion the bowl being held at a slant. The lighter chit rises to the top while the hear portion stays at the bottom. The hulls and chit are thrown out by hand or by the use of a fan made of a bird's wing, called oneg'osta'. The process of winnowing is called waegai'tawak.

The coarse granular meal so prepared is now ready for cooking. One part of meal is put in eight parts of water and boiled for two hours. Pork or bear's meat and beans are cooked with the hominy for flavoring. When cooked salt or sugar were added, according to taste.

Hulled corn, Oⁿ'no'kwa'. This favorite dish was made from some soft corn treated as corn used for bread. It was washed until free from skins and hulls and then put

in cold water and boiled for four hours until the kernels had burst open and were tender. Small chunks of meat and fat were thrown in the boiling liquid and sometimes berries. Oⁿo'kwa' is the favorite feast dish of the Iroquois. This dish is a most palatable one and appeals to all tastes. It is used at Indian social gatherings as white people use ice cream, that is, as a fitting food for festal occasions.

Dried corn soup, Onädoonondä. For winter's use, green, white, sweet or squaw sweet corn was cut from the cob and dried before a fire, taking care that the drying was rapid enough to prevent the milk from souring. The dried corn when prepared for food was boiled until tender, three-quarters of an hour. This dried corn was sometimes roasted and pounded for pudding meal.

Nut and corn pottage, Oniä' degaiyist'oⁿ onä'o'khu. This was prepared by mixing nut meal or nut milk, oniä'ge', with parched corn meal.

Corn and pumpkin pudding, Oniu'sa'odjis'kwa. This favorite pudding was made from parched or yellow corn meal mixed with sugar and boiled pumpkin or squash.

Samp, Gwä'onondä' or O'ni'yustage'. In making samp the corn was treated with the same process as for corn bread except that it was not beaten so fine in a mortar. It was boiled in water and when cooked tasted like the soup of corn bread but it did not have so delicate a flavor. Often berries or meat were mixed and cooked with samp. For samp any corn that would hull easily was used.

Corn pudding, Oⁿsoⁿ'wä. For oⁿsoⁿ'wä white corn was roasted brown and pounded slowly in a mortar and sifted until all the granules were uniform, the coarser ones being pounded and resifted until this end was achieved. The meal was then thrown in boiling water and cooked until tender.

Preserved in skin bags this meal was carried by hunters and either eaten raw with water, boiled as above or thrown in with boiling meat.

Parched corn coffee, O'nis'tagi'. Corn was well burnt and parched on the coals, scraped from the cob and thrown in a dish. Upon this boiling water was thrown and the dish or kettle placed over the fire again. To produce the burnt corn drink the boiling was continued for about five minutes.

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GLOSSARY

Alkaline hydrolysis—chemical process that in the making of a corn "tortilla" results in the release of corn protein.

Atole—warm, milky drink made from parched, boiled corn and water.

Beneficient Predator Insects—Insects that eat or displace other insects that are destructive to a particular crop.

Chiapas—department in southern Mexico, adjacent to Guatemala.

Conquistador—Spanish for conqueror; used universally to describe Spanish military early in the conquest of the Americas.

Genetic Code—biochemical basis of heredity in plant and animal life.

Handsome Lake—Seneca prophet of the early 19th century who is credited with a revitalization of Iroquois religious and cultural life.

Heart of the Sky—Mayan Indian terminology for diety overseeing daily life.

Hispaniola—Columbus' name for Caribbean island presently divided by Haiti and Santo Domingo.

Hundred Day Line—latitudinal line demarcating length of a frost-free growing season lasting at least one hundred days, required for corn.

Indigenous—original to a specific place or environment; a practice long associated with a region.

Insecticide—an agent, usually of prethro-chemical origin, that kills insects,

Maize—Taino Indian word (*mahiz*), meaning corn.

Malthus, Thomas R.—originator of population theory postulating that population grows at a faster rate than food production and will result in famine unless checked by disease or war.

Metate—from a Nahuatl Indian word (*metatl*), meaning a stone with concave surface used for grinding corn.

Millet—grasses that produce a small seed used as

cereal.

Mixtamal—from a Nahuatl word (*tamalli*), meaning a rolled tortilla containing meat or beans seasoned with chili powder.

Mono-cultigen—a product or crop cultivated by itself, to the exclusion of other uses on the same land.

Oraibi—Hopi village, continously inhabited for more than a thousand years.

Pellagra—disease associated with a niacin and protein deficiency, marked by gastrointestinal disorders, dermatitis and nervous systems disorders.

Scurvy—disease associated with lack of ascorbic acid, marked by spongy gums and loosening of the teeth.

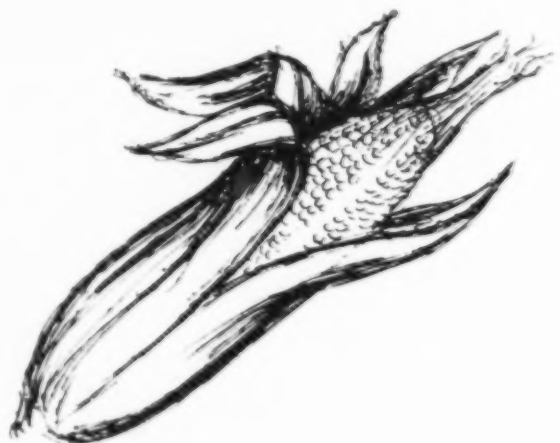
Slash-and-burn—indigenous method of cultivation, characterized by burning of trees and foliage, use of ash residue as fertilizer and rotation of fields.

Sorghum—tropical grass cereal from the Old World.

Tombeiros—word of Portuguese origen, describing tomb-like quarters of slave ships

Tortilla—a wafer-like tort made from corn flour, a staple food of Meso-American peoples.

Trans-Atlantic Passage—forced crossing of the Atlantic Ocean by African slaves.



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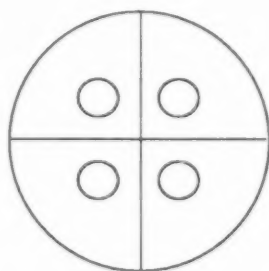
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